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ORIGINAL ARTICLES.

HELIO THERAPY IN GREAT BRITAIN: RECORDS OF AN EXPERIMENT.

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IN spite of good results reported from Berck-Plage, in the North of France, and from Alton in Hampshire, England, an impression appears to prevail among medical practitioners that heliotherapy is impracticable under conditions existing in our climate. The following brief account aims at describing lines on which it has been found possible to adapt the methods of Rollier and Poncet to climatic and other conditions in Great Britain and Ireland.

The work here described was carried out at Abergele, on the North Welsh Coast, where the Manchester Corporation have, on the same estate as their sanatorium for early pulmonary tuberculosis, established a bungalow accommodating ten beds for children suffering from non-pulmonary forms of tuberculous disease. The bungalow is an adapted building containing one fair-sized ward, kitchen, and offices. It is situated on shale, about three miles from the sea and 300 feet above sea-level, and is fairly well sheltered east and west by limestone bluffs.

No meteorological records are published of Abergele. Deganwy, fifteen miles away on the Conway estuary, in a distinctly less favourable position, has a sunlight record about equal to that of Bournemouth. Though the bungalow made a primitive hospital in many ways, one great initial advantage was that the ward opened, by means of large glass doors, on to the ground-level, so allowing the beds of bedridden patients to be readily moved into the open. The staff consisted of a charge-nurse, who worked under the direction of the matron from the sanatorium, and was relieved, when off duty, by one of the sanatorium probationers. The five essentials for the practice of heliotherapy were therefore to hand—namely, sunlight, dust-free air, a dry soil, shelter, and last, but far from least, intelligent, skilled, and conscientious nursing. In the course of the experiment, the highly desirable but not absolutely essential requirements were added—namely, open verandahs (French “terrasses”), special orthopædic apparatus and beds for cases of osteoarthritis, and suitable clothing.

The patients were, by an old-standing agreement with the Manchester Guardians of the Poor, nearly all sent by them, through the tuberculosis officer, from their children's hospital. Consequently, they were chronic cases in a late stage of the disease, and the majority had open lesions. The average duration of disease before admission was two years, the longest five, the shortest five months. Many of the cases came into the author's hands one to two years after admission.

Technique of Heliotherapy.

The technique followed Rollier's plans in the main. Modifications dictated by the necessity of profiting as soon as possible by the brief British summer were as follows: (1) The “acclimatization” period was reduced to about a week, in good weather, in the case of patients ordered general heliotherapy (exposure of the whole body surface), and to less in cases ordered local heliotherapy (exposure of the lesions only). (2) The initial exposure was increased from Rollier's five minutes to ten minutes up to twenty minutes, according to the intensity of the light.

Attention was first directed to reducing the amount of clothing worn on ordinary occasions to the minimum necessary for comfortable warmth. This applied also to bedclothes. Only one garment—a cotton shirt or vest—was worn in bed. Part of the bed-covering required at night was removed in the day, regard being had in this, as in every other detail, to the individual differences of the patient. In the open, in sunlight and shelter, coverings were further reduced.

PROGRAMME OF A PATIENT'S FIRST WEEK UNDER HELIO THERAPY.

Day.	Condition.	Duration of Exposure.		Parts Exposed.
1	In bed	In ward—free ventilation		
2	"	Out of doors		
3	"	"	" 10' to 20'	Feet and shins
4	"	"	" 20' " 40'	" " }
		"	" 10' " 20'	Thighs
5	"	"	" 30' " 60'	Feet and shins
		"	" 20' " 40'	Thighs
		"	" 10' " 20'	Abdomen
6	"	"	" 40' " 80'	Feet and shins
		"	" 30' " 60'	Thighs
		"	" 20' " 40'	Abdomen
		"	" 10' " 20'	Chest
7	"	"	" 20' " 30'	Whole body
Each suc. ceeding day	"	"	" + 20' " 30'	" "

Rollier¹ gives an excellent method of representing these rules pictorially. Some patients finally enjoyed as many hours of exposure daily as Nature provided of sunlight. Others—the minority—had for various reasons to be limited to much less. The details requiring attention are best considered by reproducing the directions given the nurse. In the case of a large staff these would necessarily be written.

Directions for the Practice of Heliotherapy.

1. Expose according to the chart (Rollier's) provided, unless otherwise directed.
2. Expose in the earlier part of the day, if possible.
3. Choose a well-sheltered site for the bed.
4. Keep patient's head covered.
5. Do not expose a patient with headache or a temperature over 100° F. If a patient complains of headache or discomfort while he is exposed, he must be removed immediately into the shade.
6. Cover exposed parts immediately if bright reddening of the skin occurs.
7. If, in spite of all care, painful reddening or a burn should occur, report the fact, so that appropriate treatment may be taken at once.
8. Record all exposures on the temperature chart.

With regard to Rule 4, each patient was provided with a cotton hat, and each bedridden patient with a sunshade of the shop awning pattern, fastened to the end of the bed. Rule 5 was not absolute as regards temperature, if the patient seemed otherwise well: it was broken only on medical direction. With regard to Rule 7, it should be

¹ "La Cure de Soleil," p. 66.

noted that severe burns can ensue from an English sun in a surprisingly short time, especially in spring, before pigmentation of the skin is well established.

General heliotherapy (of the whole body) was generally preferred, but in cool or variable weather local treatment (of the lesion alone) had perforce to be substituted, and was carried out on the same plan, *mutatis mutandis*.

"Open-Air Dressing" of Local Tuberculous Lesions.

All open local lesions were, on arrival, cleaned with 2 per cent. sterile salt solution, with sodium bicarbonate (5i to 10i), or with an alkaline disinfectant (sodium phenate or lysol), and then dressed with the minimum number of layers of plain dry sterilized gauze. If granulating surfaces were present, Wright's perforated celluloid was interposed. The whole dressing was then kept in position, protected from external contact and yet left free to air by a sinus guard of Rollier's pattern. (A Cowan's wire vaccination shield does fairly well, but should be of stout wire.) Where the granulating surface was large or there were multiple adjacent lesions, I was not able, under war conditions, to get especial guards manufactured. Stout perforated celluloid, cut the required shape and size and bound at the edge with a thick padding, made a tolerable, though not ideal, substitute. Lesions of this kind were often dressed at night with 2 per cent. salt solution fomentation. Every discharging wound was dressed at least once a day. This method of dressing was used for all open lesions all the year round. In the case of sinuses or surfaces discharging very little or not at all the guard without gauze may be used. Protection from flies was provided by stretching one layer of gauze over the guard and by inunction with a mixture of alcoholic solution of camphor and olive oil used by Rollier for sunburn.

Dietetic Considerations.

Diet was of the usual sanatorium type. Marked improvement in appetite and digestion followed the reduction of the number of meals from four to three, except, of course, in such severe cases as required frequent light nourishment.

The Conduct of Orthopædics.

Space does not permit of any description of the very important subject of orthopædic methods and apparatus. These were necessarily based on Rollier's teaching, but were modified as occasion demanded. Practically the whole of the apparatus was made on the premises, some from my own design, some from the specifications of Colonel Sir Robert Jones, Calot, and Gauvain. Gauvain's "wheelbarrow" back-door splint proved invaluable in a case with multiple lesions in the

back, which developed the symptoms of cervical caries shortly after admission. The "prone" or abdominal decubites with a pillow under the chest is indispensable, apart from orthopaedic advantages, in the heliotherapeutics of lesions on the posterior surface of the body and of convalescent spinal and hip-joint disease.

Nursing in Heliotherapy.

An examination of the rules for the nurse will reveal that much of the details must be left to her judgment. Hence the absolute need of skill, intelligence, and conscience in the nursing staff. However one may standardize exposure (*e.g.*, by comparison between the tint of photographic printing paper exposed for a given time on any day, and a coloured scale giving an exposure time-limit for each of a number of tints) in our quickly varying weather, the decision at the moment must rest with the nurse. On her it depends whether asepsis and immobilization are maintained, whether odd hours of sunshine on rainy days are utilized, whether a sinus guard deserves its name or excoriates the surrounding epidermis, and other important details.

As a corollary it is questionable whether heliotherapy is practicable outside of *special* institutions and private practice in comfortable homes. Nevertheless, Poncet (quoted by Jaubert) had good results in Lyons attics, and I have seen in hospital out-patient practice one or two selected cases of cervical adenitis improve with "open dressing."

The Question of Clothing in Heliotherapy.

The clothing, both bedclothes and personal, requires the direct supervision of the medical attendant. It should on all occasions be light and loose, consist of the minimum number of seasonable garments, and cover uniformly all the body surface. For the sunbath the children at Abergele wore bathing-drawers or slips, and in summer at other times cotton shirts or tunics and knickers. In winter the same garments were made of warm material, and washable undergarments were added. Each child was provided with a three-quarter length pilot-cloth cloak, with a detachable hood. They were well worth the initial expense, as they wear for an indefinite time, protect against all weathers in winter, are easily assumed or discarded in the cool evenings or mornings of summer, are equally suitable for ambulant and bedridden cases, and do not interfere with slings or splints. Two or three stock sizes meet all requirements.

Results of Heliotherapeutic Measures.

In view of the small number of cases treated (twenty, including cases treated with aërotherapy alone) and the short duration (eighteen months) relative to the long course of the disease, it is not possible to

dogmatize about results. With this proviso it may be said: (1) That the practice of heliotherapy revolutionizes the routine treatment of the disease:

(2) The patients live in the open air, as distinct from a well-ventilated ward. After the erection of a roofed verandah enabled the children to stay outside even in showery weather and at night, their general health (appetite, sleep, nutrition) improved, and no cases of "relapse," coryza, nor dermatitis occurred. This corresponds to experience at the Royal Liverpool County Hospital at Heswall, where some of the wards are closed and others are open verandahs, and to reports from the Open-Air Military Hospital at Cambridge.

(3) Heliotherapy includes *pari passu* aerotherapy. The good effects of transference to the open may be (a) physical, due to increased air movement, and (b) psychic, due to more spacious outlook. The effects of general heliotherapy in improving the general condition are marked. An extreme example of this was a convalescent case of tuberculous enteritis, a girl of seven. She had been admitted in 1915 in a state of collapse, and for a year after the disappearance of acute symptoms remained stunted, anæmic, dull-witted, capricious in appetite, and flabby in musculature. From the time that general heliotherapy was started she began to add inches to her stature, became rosy, sturdy, eager for her meals, and, in the words of her nurse, "quite cheeky." But a similar, though less marked, improvement occurred in a girl of eleven years, a convalescent case of spinal caries, who with red hair and thin white skin failed to pigment, and therefore could not tolerate more than an hour's direct sunlight, but enjoyed air-baths in the shade.

(4) The "open-dressing" method enforces frequent aseptic dressing and attention such as similar lesions seldom get in a crowded out-patient department or workhouse ward. Example: A boy of nine years, admitted in September, 1916, had two granulating surfaces, one at the angle of the jaw, the result of a broken-down scar from gland-excision (performed in 1915), and one of equal extent on the chest from a ruptured subcutaneous abscess. The scar extended under the chin from one ear to the other. That part of the scar which had healed before admission was poorly vascularized, puckered, and showed numerous "tabs" of skin. Both wounds were dressed in the open method; no sunlight was available. By January, 1917, both lesions were firmly cicatrized. The cervical lesion, not being covered by the clothing, healed some weeks before the other. The contrast between the old cervical scar and the smooth, supple, and well-vascularized area, which had healed after admission, was remarkable. The cosmetic effects of "open dressing" were, without exception, good.

(5) It is true not only of open, but of all lesions, that it was possible on the briefest examination, and with a minimum of disturbance of the

patient, to judge the progress of a lesion or the effectiveness of apparatus.

The results of the revolutionary measures were therefore encouraging. How much of the sum-total was due to heliotherapy? Comparison between cases treated in winter and those which had heliotherapy, and between the same case in the presence and absence of sunlight, appeared to show—

1. That the rate of cicatrization of superficial granulations was quicker in sunlight than in air alone. Short sinuses reacted in the same way. In both discharge diminished progressively.

2. Superficial spongy granulations, laden with pus, rare with aërotherapy, were never seen with heliotherapy.

3. Sunlight acted as an anodyne on deep acute lesions. A girl of fifteen years, sent for observation, had acute pain and tenderness over the spine. The case proved to be one of late rickets. The symptoms disappeared quickly under general heliotherapy, though they had not yielded to rest alone. A boy of five years with early hip-joint disease developed acute pain with thickening over the great trochanter while he was immobilized in bed. The local symptoms disappeared with general heliotherapy.

4. Three deep closed cases (chronic peroneal tenosynovitis, hip-joint disease, astragaloid disease) appeared to slow down in the rate of absorption of infiltration during prolonged absence of sunlight. It was difficult, however, to be certain of the cause.

The Cause of Some Comparative Failures.

The girl with spinal caries mentioned above had a deep sinus from an old psoas abscess. The sinus remained obstinately *in statu quo* throughout. Beck's bismuth-paste injections failed equally, also iodine swabbing. This patient, as noted, could not tolerate the prolonged sunbath. A case of knee-joint disease had finally to be resected, because, though X rays showed fibrous union in good position, there was still synovial disease below the patella. This boy had had prolonged general heliotherapy, and had pigmented deeply. One case (acute hip-joint disease, abscess-formation, abscess evacuated and closed after admission) did well in the sunny autumn of 1915, but developed fresh abscesses early in the following spring. (At that time there were no verandahs, and the weather was very wild, the bedridden cases being confined to the ward for weeks.) Fever, toxæmia, and a subjective dislike of bright light prevented the use of heliotherapy. The limb, if not the life, was saved by incision, drainage, and constant irrigation with hypertonic salt solution. Heliotherapy, called in later, resulted in swift cicatrization with good cosmetic effect by January, 1917. The joint is now in plaster, and the boy ready for patten and crutches.

It may be said that the routine treatment for hitherto unopened collections of pus was aspiration. Repeated aspiration plus heliotherapy gave a better result than incision and suture, even if the skin finally gave way.

The Question of Pigmentation.

In general the most successful cases showed the deepest pigmentation. The child with enteritis improved in pigmentation-power in the course of treatment. On the other hand, the girl with spinal caries, who refused to pigment, appeared in other respects to have a fair resistance, and a boy with tenosynovitis pigmented deeply, though his family history was exceptionally bad, and he suffered from recurrent symptoms suggesting bacillæmia—*e.g.*, glandular swellings and arthritis of the "rheumatoid" type in the hands. The view of Rollier, shared by Gauvain, that pigmentation-power is a measure of resistance seems in need of restatement.

The facts could be explained in the same way as one explains the progress of a case of syphilis which improves under iodides, and the failure to progress of a case which, being intolerant of iodides, cannot be treated with them.

It was found possible to start local heliotherapy as early as February and as late as November, general from April to early October.

On the Choice of a Site for Heliotherapy.

Reference may be made to Jaubert's excellent little handbook for a discussion of suitable sites for the practice of heliotherapy. To what is said there and what is implied above may be added that the meteorological records show the east and south coasts of Great Britain to have the lowest rainfall and the highest sunlight records.

As regards Ireland, the south-eastern coast has a better average than any part of Wales.

In our windy climate, shelter is an important matter in proportion to the number of immobilized cases that it is proposed to treat. If wood provide shelter it should be of conifers, since these provide equal cover all the year round, and, having a minimum of decayed undergrowth, discourage the breeding of flies.

Any soil but a heavy clay is admissible in the last resort. A clay soil, by loading the atmosphere with moisture, makes cold weather raw, hot enervating, reduces the duration and intensity of sunlight, and shortens the season during which general exposure can be practised.

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THE PAPILLARY CUTANEOUS REACTION IN TUBERCULOSIS.

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WHEN in 1907 Von Pirquet and Naegeli introduced the cutaneous test for tuberculosis, the opinion then generally held was that it was only necessary to prove the presence of the tubercle bacillus in an individual to condemn him as suffering from some form of active or chronic tuberculosis. This view had been arrived at as the direct result of Koch's discoveries that the presence of tubercle bacilli in the sputum meant the existence of active tuberculous disease, and consequently it was argued that if a person reacted to tuberculin a clinically diseased condition must be considered to exist. Since 1907 the further accumulation of evidence has conclusively demonstrated that a very large proportion of the population (probably 60 to 80 per cent.) has at some time or another been infected by the tubercle bacillus, and it has also been shown that there exists no co-relation between the demonstration of the presence of the micro-organism in the human organism by the original cutaneous test, as applied by Von Pirquet, and the presence of active disease, although a negative reaction is strong presumptive evidence that the human organism has never been subjected to tuberculous infection. In rapid succession came various other methods of applying tuberculin so as to elicit a specific reaction, with a view to arriving at the desired information. This might be stated to be, Was there any means by which the susceptibility of the infected organism to the specific tuberculin could be co-related to the condition of the individual patient, in such a manner as to form fair presumptive evidence that the tuberculous invasion had assumed the proportions pathologically constituting clinically active disease, and therefore demanding serious attention?

It is now recognized that the tubercle bacillus may be present in the living organism of man and certain other animals, and not only do no harm, but really accomplish a certain amount of good, by stimulating the tissues to rise to a higher degree of protective immunity, and thus safeguard the individual from a casual tuberculous invasion. There is little doubt that only one in about every three or four of those infected by the tubercle bacillus ever displays any symptom of active disease. This postulates in addition that normally the resistance of the organism is quite sufficient to deal with the ordinary dangers arising out of

infection, as the tissue resistance is quite sufficient to cope with any demands made upon it. The natural resistance is generally overcome only by either mass infection, the continued presence of ill-health, or other strain which places the tissues at a disadvantage. It still remains a matter of importance to see if a differential reaction can be obtained of such a character as to elucidate the problem of the early recognition of the active phase of the disease, which presupposes this loss of resistance, in contra-distinction to the non-active or passive stage usually existing.

Subcutaneous Tuberculin Tests.

Up to the year 1907 Koch's subcutaneous method had been the only one used in arriving at the diagnosis of the presence of tubercle bacilli by the use of tuberculin, although Epstein had already recorded the susceptibility of the skin in the needle-point reaction in 1891.¹ The specific character of this reaction was further illustrated by Von Pirquet and Schick in 1905.² Von Pirquet described his method of abrading the mucous layer without drawing blood in 1908.³ Moro worked out a method of obtaining a cutaneous reaction on the skin by means of a tuberculin ointment of 5 c.c. of Koch's "old" tuberculin in 5 grammes of lanoline.⁴ Wolf-Eisner⁵ and Calmette⁶ used the reaction obtained in the conjunctiva, and also various dilutions limited to one application to each eye, as the second application might do mischief. Mendel⁷ suggested the use of tuberculin intracutaneously; and Römer⁸ investigated this method in animals, and was able to arrive at very definite conclusions in guinea-pigs by varying the infections in quality and strength of the injected tuberculin. Applied to the human species, up to the present they have been found too complicated for general practice, and usually proved too little or too much.

The principal argument used against the general employment of Von Pirquet has been its too great sensitiveness, as all cases who had been infected at any time responded in some degree or other; its extensive application, however, demonstrated conclusively the very extensive infection of the ordinary urbane population.

¹ Epstein, *cit.* Hamburger: *Wien. klin. Wochenschr.*, xxi, 381, 1908.

² Schick: "Die diagnostische Tuberkulinreaktion im Kindesalter," *Jahrb. f. Kinderh.*, lxi, 811, 1905.

³ V. Pirquet: "Handbuch der Technik und Methodik der Immunitätsforschung," Von Kraus and Levaditi, June, 1905, 1908.

⁴ Moro and Doganoff: *Wien. klin. med. Wochenschr.*, xx, 933, 1907; Moro: *München. med. Wochenschr.*, lv, 216, 1908.

⁵ Wolf-Eisner: "Discussion on Tuberculin," *Berl. klin. Wochenschr.*, xlv, 10, 1907.

⁶ Calmette: "Un nouveau procédé de diagnostic de la tuberculose chez l'homme," *Presse méd.*, xv, 388, 1907.

⁷ Mendel: *Med. Klin.*, iv, 402, 1908.

⁸ Römer: *Beitr. z. Klin. d. Tuberkh.*, xiv, 1, 1909.

Various attempts have been made to obtain greater accuracy by measuring the resulting cutaneous reaction in various dilutions, notably by Ellerman and Erlandsen,¹ White and Van Norman,² Morland,³ and Hammar and Wolman,⁴ using various solutions from original T. to 1 in 100; but the differences have been too slight and variable for satisfactory accuracy, and in many instances the number of dilutions used have in addition been insufficient.

The points which the present investigator insists on as essential to procuring a satisfactory result are that the scarification must open the papillary layer of the skin so as to reach the bloodvessels, not the lymphatics, as in Von Pirquet: the scarification cuts must be multiple, not single; there must be six to nine contiguous scratchings; next, the dilutions must be more dilute than any previously used, except in Römer's intradermic work on guinea-pigs, with which it accords, both in dilutions and results; all the scarifications should be made at the one operation, so that their results may be contrasted at the same time, not by measurement, but by all the varieties of differentiation, such as colour, elevation, area, disappearance of cut marks, time as well as the number of marks reacting being considered.

To have general application, the method should be easy to the general practitioner, and this is as simple as vaccination, using only various dilutions instead of one. The results have proved singularly reliable so far as they have been recorded. The details of the technique are accurately set forth in the *Lancet* of October 7, 1916, together with the analyses of 500 cases. The scarifications are made with the old form of vaccination lancet, and the various dilutions used are original P.T.O. (I.) as the bovine one, and dilutions of old tuberculin (T.) for the human. The T. dilutions used are 1 in 10 (II.); 1 in 100 (III.); 1 in 500 (IV.); 1 in 1,000 (V.); and 1 in 10,000 (VI.). Original T. is not at present used, as it is found sometimes to cause an unpleasantly severe local reaction.

The scarification area is about 1 mm. in diameter, and has generally from six to nine light scratches made through a drop of solution previously placed on the left forearm as the most suitable place. The marks are then covered over with cotton-wool, retained in place by strapping. The results are compared forty-eight hours after, but should, if convenient, be seen the first and third day as well.

When the technique is properly applied, the results are remarkably reliable, and certain definite conclusions can be arrived at, of great importance, both as regards the early recognition of the active phase

¹ Ellerman and Erlandsen: *Deutsch. med. Wochenschr.*, xxxv. 436, 1909.

² White and Van Norman: *Trans. Nat. Assoc. for the Study of Prevention of Tuberculosis*, vi. 224, 1910.

³ E. R. Morland: *Lancet*, September 7, 1912.

⁴ Hammar and Wolman: "Tuberculin in Diagnosis and Treatment."

of the disease as well as general information of the greater value both in prognosis and treatment.

According to the number of marks reacting, it has been found practical to divide cases into various classes, each representing a different prognosis and treatment, certainly as far as tuberculin is concerned. The classes have been named Hypersensitive, Sensitive, Sub-sensitive, and Insensitive, in the order of reaction. Hypersensitives are those responding in a marked manner to 1 in 500 (IV.) and over. Sensitives are those definitely responding to 1 in 100 (III.). In sub-sensitives the reactions are under 1 in 100. Usually I. and II., as they are approximately of equal strength. Unless very bright in colour, these reactions do not suggest by their appearance that much cutaneous sensitiveness is present. The insensitives may react, but do so very slightly in dark-coloured marks with no elevation.

Those giving slight or no reaction are divided into two classes—those that have never been infected, or only slightly a long time ago; and those who are heavily infected.

The resistance of these latter has been overpowered, and they therefore cease to give a cutaneous reaction at all, or only do so very slightly; these cases have really arrived at the stage of reaction paralysis. This occurs in dying cases; where the area of lung involved is at all extensive, and the reaction is little and dark-coloured, the prognosis is very bad. This does not hold to the same extent when the abdomen is affected, or when a pleuritic effusion has been recently absorbed, or is absorbing. In these cases there is generally little or no reaction, doubtless due to the quantity of tuberculin being absorbed; the prognosis of no reaction is not, therefore, so serious in them. In fact, the existence of pleurisy and abdominal infection are the most vitiating circumstances in the correct reading of this form of cutaneous reaction, and it must be remembered a course of tuberculin likewise lowers the cutaneous reactivity.

Hypersensitive cases reacting to 1 in 500 (IV.) or over are much more common than would have been anticipated, as they have so far formed, roughly, a fifth of those reacting. It does not follow, because high reaction is given, that there is a large amount of tissue involved; rather the other way—the amount of lung may be quite small and difficult to detect. But experience has shown that lung cases giving a high reaction want careful watching. This class also contains double infections or infection of two dissimilar tissues, cases of large and intractable glands, intradermic abscesses, the eye tubercles, and various lupus infections. The great importance of this class is their hypersensitiveness to tuberculin. When dealing with hypersensitives, injections must be used very cautiously and in very high dilutions. Some cases in this class have not yet, after eighteen months' treatment, been

able to stand stronger injections than the sixth dilution without producing unpleasant symptoms. I feel sure that no person not intimately acquainted with the use of tuberculin should ever use injections in these cases, even for diagnostic purposes. Nevertheless, the great majority, if cautiously injected, may be gradually educated out of their hypersensitiveness to their material well-being and comfort; but it takes great patience and great caution. It is when encountering these hypersensitive cases that the hypodermic injection of tuberculin diagnosis of tubercle is dangerous, used as routine practice, as even a small dose may light up considerable mischief, which may take a long time to subside. These cases often display nervous symptoms and undue fatigue, as their first indications of ill-health, and are undoubtedly suffering from autogenous tuberculin irritation, which symptom I describe as the raw edge of tuberculin.

The ordinary sensitive cases, who give a marked reaction to 1 in 100 T. dilution, may be considered as having a normal tuberculin reaction in ordinary phthisis. Among these cases are most of the treatable cases who give fairly satisfactory results. They form about half the total number tested. This class yield best results to tuberculin injections, and derive most advantage from its use. They are usually cases of moderate lung invasion, and they give in their reaction a definite raised swelling, red in colour, about the shade of the lips, and show these characteristics distinctly on the III. mark. This I consider the normal reaction. The brighter the colour, the more active and recent is the case, passing into the œdematous condition suggesting hypersensitiveness. On the other hand, the darker the colour the older the case, passing into the low dark red colour suggesting the oncoming of tuberculin paralysis, or an old-standing quiescent case. The normal case reacting definitely to III., but not excessively, should usually give a satisfactory result to treatment if handled carefully; the resistance to the tuberculin poison is generally easily raised, by the use of tuberculin, to the safety-point, and then they do not tend to relapse to subsequent ailments.

The treatment of the case of the hypersensitive may be just as satisfactory, but the use of tuberculin must be commenced with higher dilutions and raised much more cautiously. In both these classes local reaction after injection is quite a safe guide. When cases are hypersensitive, it is usually best to begin with the seventh dilution, or even the eighth, if excessively so; while in III. the sixth dilution may be used quite safely to commence with, and the doses may be raised much more rapidly.

Coming now to the other intermediate class which is called sub-sensitive—the cases which give a definite reaction similar to the last, but fail to react to mark III., or do so very slightly—these cases

divide themselves into two varieties in a similar manner to the insensitives : those cases going to the bad and losing their tuberculin cutaneous sensitiveness, and those earlier remote cases in which prognosis is favourable. If the area involved is at all extensive, response to only II. is a bad sign ; and if the reaction is dark in colour, with slight swelling, the case is going to the bad. In these cases the control often shows all the appearances of a reaction in the darkness of the colour and œdema caused by the trauma. The reaction of the control either to swelling or colour, or both, is always a suspicious symptom which suggests interference with the circulation or blood-changes, and should always command attention, even if the case is not tuberculous, as it indicates bad health from some cause or other.

The early active case, the response to II., is bright red, with considerable swelling, and suggests rather an inflammatory than an œdematous look. If it is very marked, the case is probably incipient, and should be treated as a III. As a rule, this reaction means good resistance rather than active disease, whereas where a definite III. is recorded I consider active disease is always present and the resistance of the patient is seriously threatened. This opinion that III. means an active disease has become very definite since the military recruiting examinations, when III. have been withheld for observation, and they have almost universally shown that the warning was correct, and that the danger to their resistance was considerable.

In cases of old infection completely quiescent, and the reaction is usually a dark stain of a brownish colour with only slight elevation, the infection has probably completely disappeared, possibly never having caused much disturbance. Generally, in cases reacting to II., the site of the old invasion may be discovered with the stethoscope ; but it is perfectly quiescent, and is clinically of no importance. In many of these cases they had spontaneously recovered, the lung alterations being discovered during routine examination ; the practitioner sends them along for diagnosis.

Variations in Cutaneous Tuberculin Reactions.

In a general consideration of the variations to which reactions to this multipapillary cutaneous method (M.P.C.) are liable, certain considerations are worth recording. The first and most important one, which has materially modified my last three or four hundred results, has been a general alteration of the intensity of the reactions, due to a variation of the tuberculin itself. This has somewhat complicated the whole question for the present. It is needless to say, if the testing solution varies, the differentiation of the test is modified in a similar manner, and when this factor is unknown a material complication has been introduced. This has unfortunately occurred during the last



FIG. 1.—TAKEN FROM A PHOTOGRAPH ILLUSTRATING CUTANEOUS REACTION WITH TUBERCULIN.

The figure shows six positive reactions on the arm of a tuberculous subject.



FIG. 2.—TAKEN FROM A PHOTOGRAPH ILLUSTRATING CUTANEOUS REACTION WITH TUBERCULIN.

P.T.O. negative, 1 in 10, 1 in 100 T. positives.
 Left to right: Original P.T.O., T. 1 in 10, 1 in 100, 1 in 500, 1 in 1,000,
 1 in 10,000, Control.

eight months; the tests have been too numerous and varied to leave any room for doubt. These comparison tests have been made with the two solutions diluted simultaneously, similarly prepared, and applied to the same area, in the same manner, and at the same time, and the results in many instances have been recorded photographically. The results prove beyond question that the various brands on the market differ in cutaneous reaction strength; and, what is more disconcerting, those supplied by the same firms may also have a varying action. Since last July, I have been unable to get a T. of similar potency to that used previously; the P.T.O. has sometimes had one strength, and sometimes another. The work I am at present engaged on is standardizing the materials so that uniform action can be relied on.

At present, those tuberculins which are standardized at all are standardized to the lethal dose in the guinea-pig; and I believe that the beneficial value of tuberculin is connected with the qualities producing the cutaneous reaction, and am attempting to standardize tuberculins in this direction. Similar tuberculins similarly applied always give on the forearm at least similar and co-ordinate results. In the 1,500 cases to which the test has been applied, presuming the papillary layer has been similarly scarified, uniform results have been always obtained, and the variations have been negligible: II. always reacts more than III., and III. than IV. The keeping qualities of the original solution do not materially alter. An original bottle of T. brought back from Australia three years ago was found of greater potency than any bottle of T. supplied by the same firm since July last year. The various preparations supplied by different firms varied to this standard in reduction from one-tenth to no reaction at all with all grades in between. The year's work has not been wasted, although somewhat vitiated; but definite information has been acquired which will make for greater accuracy, which in a drug so potent as tuberculin, in a disease so complicated as tuberculosis, is a factor of very primary importance.

The next outstanding factor is the great reliability of the test both for diagnosis and prognosis, even in its vitiated application, described above. When one has become acquainted with the various reactions, it rarely leads astray or misinforms; and when controlled by sputum examination, both for albumose and for the bacillus, and the results co-ordinated with the physical examination, the room for error is very slight, even in early cases. Probably not more than 3 per cent. of cases which are tubercular have failed from some cause or other to adequately respond. There are likewise a few cases in which the M.P.C. reaction appears to overstate the case, as judged by subsequent results; it may have been that the response to treatment, in re-establishing their resistance, has been unusually easily obtained. What has been amply

borne out by the continued observation is that the threat the reaction reveals should not be disregarded. This has proved to be exceptionally true in those cases sent by the recruiting department for diagnosis, and who have been held back for three months' observation because of the warning given by the M.P.C. that their condition was critical. Quite a large number that would otherwise have been passed have shown by their subsequent history that they would probably have broken down, although there were not sufficient physical signs to warrant otherwise their rejection. Up to the present we have not found that any passed cases have been returned. It is too soon to be sure yet, but it is very satisfactory; on the other hand, two cases examined who gave a definite warning reaction, but who had no very definite lung symptom, and who without my knowledge succeeded in enlisting, have been returned, having become definitely tuberculous.

However much I feel inclined to do so, I never now disregard the warning of the hypersensitiveness, as observations have confirmed that in this particular the test is invariably reliable. Cutaneous hypersensitiveness is a definite tuberculous condition, and demands its own special considerations in any scheme of treatment. During the year a new reaction has become evident which is very interesting and gives much food for thought.

In a certain number of cases the control gives quite a marked reaction from the traumatic injury to the tissues, both in discoloration and swelling; this, of course, varies with the individual and his condition of health at the time (note that this reaction should be investigated with a view to finding its relation to disease in general). In special cases the tuberculin applied seems to obliterate this control reaction in so marked a manner that, somewhere in the series, a point is reached where there is no reaction at all. This is after the tuberculin reaction has ceased. This produces the condition that no reaction at all comes in the middle of the series, when the tuberculin reaction has ceased on one side, and the trauma reaction controlled by the tuberculin has ceased to eventuate on the other. This is now recorded as a recessive reaction, the mark at which the reaction is obliterated being recorded—say recessive at III. The significance of this reaction has not yet been elucidated, but as a variant it is very interesting.

The total result of the work to date shows the absolute importance of the multiple cutaneous reaction. Without the knowledge it imparts, the cases cannot be classified, as they should be, into the four main classes as regards their reaction to tuberculin—viz., Hypersensitive, Sensitive, Subsensitive, and Insensitive. Any records of tuberculin treatment overlooking some such manner of classification can have little value, as each class has such a different roll, in relation to the drug, even if the additional information, derived about each individual

case, did not more than amply repay the difficulty of acquiring the necessary technique. From the patient's own point of view, also, it has proved invaluable, as by its ocular demonstration it has materially assisted in carrying conviction, to his mind, of the importance of his condition, one of the most difficult things to satisfactorily effect in the early tuberculous.

TYPES OF TUBERCLE BACILLI IN HUMAN TUBERCULOSIS.¹

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SINCE the publication of the Final Report of the British Commission on Tuberculosis in 1911, a considerable amount of work has been done upon the differentiation of the types of tubercle bacilli found in various kinds of human tuberculosis. I propose in this paper to summarize the results of the work on this subject which has been published by the investigators who carried out the practical work of the Commission. I have restricted my review of recent researches to the work of these observers because their methods of investigation were substantially the same, and their results are strictly comparable. The bacteriological methods employed in these researches are those which the experience gained during the work of the Commission had shown to be the best for bringing out the differential characteristics of strains of tubercle bacilli.

The main objects of the investigations were the following: (1) To determine by the examination of unselected series of cases the relative proportions of the human and the bovine types of tubercle bacilli in different kinds of human tuberculosis; (2) to ascertain the frequency of occurrence and the distribution in the human body of variant strains of tubercle bacilli.

As the cases examined were unselected, and the methods of investigation identical, the results are of great value for statistical and comparative purposes.

The accompanying table (Table I.) gives the proportion of human, bovine, and atypical tubercle bacilli found at different age periods in each series of cases examined. In order to make this tabular summary a complete presentation of the work done in Britain by observers using the same methods, I have included the figures of the

¹ Report to the Medical Research Committee.

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TABLE I.—GIVING A SUMMARY OF RESULTS OF THE DIFFERENT INVESTIGATIONS REGARDING TYPES OF TUBERCLE BACILLI.

Series.	Age Periods.	Number of Cases.	Type of Infection.				Per Cent. of Bovine* Infections.
			Human.	Bovine.	Mixtures (Human and Bovine).	Atypical.	
British Commission on Tuberculosis, ¹	0 to 5 years	35	19	14	2		45.71
	5 „ 10 „	11	8	3			27.27
	10 „ 16 years	6	6				
	16 and upwards	27	25		2		7.4
	All ages	80†	59	17	4		26.25
Post-mortem cases in children, ²	0 to 5 years	61	48	13			21.31
	5 „ 12 „	52	45	5	1	1	11.53
	All ages	113	93	18	1	1	16.81
Sputum, ³ and ⁴	10 to 16 years	6	6				
	16 and upwards	206	199	3		4	1.45
	All ages	212	205	3		4	1.41
Bone and joint tuberculosis, ⁵ and ⁶	0 to 5 years	84	57	25		2	29.76
	5 „ 10 „	167	121	42		4	25.15
	10 „ 16 „	89	76	8		5	8.98
	16 and upwards	52	46	3		3	5.76
	All ages	392	300	78		14	19.9
Genito-urinary tuberculosis, ⁷	10 to 16 years	2	2				
	16 and upwards	15	12	3			20.0
	All ages	17	14	3			17.65
Cervical gland tuberculosis, ⁸ and ⁹	0 to 5 years	14	2	12			85.71
	5 „ 10 „	29	10	19			65.51
	10 „ 16 „	22	13	8		1	36.36
	16 and upwards	37	27	9		1	24.32
	All ages	102	52	48		2	47.05
Miscellaneous cases excluded from Series ⁴ and ⁶	0 to 5 years	2	1	1			
	5 „ 10 „	6	5	1			
	10 „ 16 „	2	2				
	16 and upwards	4	4				
	All ages	14	12	2			14.3
	Grand total	930	735	169	5	21	18.7

* Including the cases of mixed infection.

† Including one case—H 34, C. U.—the age of which was not stated.

SUMMARY OF RESULTS WITH LUPUS, 10 and 11.

Age when Lupus first appeared.	Number of Cases.	Culturally Human.		Culturally Bovine.		Percentage of Bovine Type.
		Standard Virulence.	Attenuated Virulence.	Standard Virulence.	Attenuated Virulence.	
0 to 5 years	11	1	3	2	5	63·6
5 " 10 "	19	2	7	2	8	52·6
10 " 16 "	6		3		3	50·0
16 and upwards	9	2	5		2	22·2
Total ..	45	5	18	4	18	48·9

Royal Commission on Tuberculosis. The sputum and lupus cases investigated for the Commission have been incorporated in like series subsequently examined. The rest of the Commission's cases, comprising several short series of many clinical types of tuberculosis, are grouped together and placed first in the table.

The results of the investigation of cases of lupus are tabulated differently from those of other forms of tuberculosis, in order to distinguish variant strains considered to belong to the bovine group of tubercle bacilli from those of the human group. All the atypical strains found in varieties of human tuberculosis other than lupus have shown closer resemblance to the human than to the bovine type of tubercle bacillus, while 50 per cent. of the atypical strains from lupus fall within the bovine group. Had all the lupus strains which have deviated from the standard types been classed together under the one heading "atypical," the extent to which tubercle bacilli of bovine type are a cause of human tuberculosis would not have been apparent. The lupus figures, however, have not been added to the total of the other series, because the classification of lupus strains is provisional and may possibly, in certain instances, be altered when the experimental data are finally analyzed.

The total number of cases of human tuberculosis, excluding lupus, summarized in Table I. is 930.

This series comprises all the chief clinical varieties of the disease, and includes a number of post-mortem cases. The highest proportion of bovine infections has been found in cervical gland tuberculosis and in cases in which post-mortem examination showed the tuberculosis to have been of intestinal origin. Of the cases in children under ten years of age dying from all causes investigated for the Local Government Board, in which the evidence pointed clearly to the alimentary tract as the portal of entry of the tubercle bacilli, 74 per cent. (14 out of 19) were caused by bovine tubercle bacilli. It is interesting to note that this percentage of bovine infections in post-mortem cases is practically

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the same as that in cervical gland tuberculosis for children under ten years of age—*i.e.*, 72·1 per cent. (31 out of 43).

In cases in which the tuberculosis was apparently of respiratory origin—*i.e.*, in phthisis and bronchial gland tuberculosis—the bovine tubercle bacillus has been found but rarely. Of the 212 cases in which sputum was the original material, only 3 (1·4 per cent.) yielded tubercle bacilli of bovine type. In the bronchial gland tuberculosis of children bovine tubercle bacilli have been found twice, but in each of these instances they were associated with human tubercle bacilli, and only came to light after passage of the original material through animals.

From the second table herewith presented (Table II.), which gives the proportion of standard and variant strains found at various age periods in this series of 930 cases, it is seen that the greatest incidence of bovine infections is on children under five years of age. Thereafter there is gradual decline of bovine infection, and the proportion in adult life is very small.

TABLE II.—INDICATING PROPORTION OF STANDARD AND VARIANT STRAINS OF TUBERCLE BACILLI.

Age Periods.	Number of Cases.	Type of Infection.				Percentage of Bovine Infection. ¹
		Human.	Bovine.	Mixtures (Human and Bovine).	Atypical.	
0 to 5 years	196	127	65	2	2	34·2
5 „ 10 „	265	189	70	1	5	26·8
10 „ 16 „	127	105	16		6	12·6
16 and upwards	341	313	18	2	8	5·9
Totals ..	930 ²	735	169	5	21	18·7

An important result of the work of the Royal Commission on Tuberculosis was the discovery of attenuated strains both of human and of bovine tubercle bacilli in lupus. Recent researches have fully confirmed the results of the Commission, and have revealed the existence of yet other varieties of atypical tubercle bacilli.

It is not possible in this short article to give details of the characteristics of these atypical strains, but a brief statement may be made with regard to their classification.

All the atypical strains included in the table are variants of the mammalian types of tubercle bacilli, the human and the bovine. They have deviated from one or other of these types either in cultural characteristics alone or in virulence alone (with three exceptions, see

¹ Including the cases of mixed infection.

² Including one case in which age not stated.

footnote, Table III.). According to the way in which they have deviated from the standard types, the atypical strains so far reported on may be placed in one or other of three classes. Table III. indicates the distinguishing features of each of these classes, and gives also the varieties of tuberculosis in which the different classes of atypical strains have been found.

TABLE III.—SHOWING A CLASSIFICATION OF ATYPICAL STRAINS OF TUBERCLE BACILLI.

Class.	Cultural Characteristics.	Virulence.	Number of Strains.	Source.
Class 1.	Dysgonic	Lower than standard bovine	17	Lupus
Class 2.	Eugonic	Lower than standard human	20	Nineteen from lupus, one from cervical glands
Class 3.	(a) Dysgonic on all media	Standard human ¹	4	Bone and joint tuberculosis ²
	(b) Eugonic on serum and glycerin serum, dysgonic on other glycerin media	Standard human	14	Ten from bone and joint and one from cervical gland tuberculosis; three from sputum
	(c) As in (b), but less dysgonic on "other" glycerin media	Standard human ¹	2	Bone and joint tuberculosis and sputum

While the strains in each of these classes have exhibited the same kind of divergence, they have differed among themselves in the degree to which they have deviated from the standard. Thus, in Classes 1 and 2 there are many grades of virulence below that of the standard, and in Class 3 cultural luxuriance has varied within wide limits.

The strains have also shown differences in the stability of the aberrant characteristic. While the great majority of the strains retained their atypical characters unaltered when passed through the bodies of animals or subcultivated for long periods on artificial media, a proportion of them under these experimental conditions manifested instability, reverting to that type of which they had been judged to be atypical varieties. Thus, in Class 1 many of the strains by passage through animals became so increased in virulence as to be indistinguishable from standard bovine tubercle, and in Class 3 one strain by subculture on glycerin media attained to the full luxuriance of the human type of tubercle bacillus.

¹ Three strains, two in (a) and one in (c), of slightly lower virulence for the guinea-pig than standard human strains, are provisionally included in this class.

² Including H 99, a child, aged nine and three-quarter years, with tuberculosis of spine, rib, mesenteric glands, and spleen.

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The subject of the classification of atypical strains of tubercle bacilli, upon a large number of which I have still to report, will be dealt with more fully in a forthcoming paper on lupus.

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THE PREVENTION AND CURE OF TUBERCULOSIS.¹

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THERE are in England and Wales over 50,000 deaths from tuberculosis each year. In the Administrative County of Lancaster, with a population of about one and three-quarter millions, the losses amount to over 2,000. Of these deaths the great majority are due to tuberculosis of the lungs, and are unique when compared with all other causes of death, because most persons die from consumption in the prime of life between the ages of 25 and 45. When one considers that many persons who contract and die from consumption are previously strong healthy persons, the heavy loss to the nation through this disease does not require any further emphasis. Before any effective steps can be taken to prevent the development of a particular disease, the cause, or causes, must be known. Tuberculosis is now recognized as an infectious disease spread by the *Bacillus tuberculosis*. If this pathogenic agent could be eradicated, the prevention of the disease would be accomplished.

¹ The substance of this paper is based on a report presented to the Lancashire County Council, August 2, 1917.

The Prevention of Tuberculosis.

Unfortunately, the problem of the eradication of the tuberculosis bacillus is very difficult and complicated, and is perhaps the most difficult task yet attempted by preventive medicine. The two primary sources of the bacillus of tuberculosis are—(1) Infected cattle. (2) Infected human persons.

There are two methods of attack which are possible. The first is the direct method—namely, to discover and destroy all infected cattle, and to discover and isolate all infectious persons who are a danger to the public health. If this were done clearly the prevention of the disease would be complete. To deal with cattle is relatively easy. There is, as is well known, the Tuberculosis Order of 1914, which provides for the notification, inspection, and destruction of diseased animals, and also for compensation. The Order at present is *suspended* by the Board of Agriculture, so that while one Government Department—the Local Government Board—urges local authorities to undertake effective and expensive schemes to prevent tuberculosis, another—the Board of Agriculture—meanwhile prohibits measures which should be directed against one of the sources of infection. Further comment is superfluous.

Isolation of infectious tuberculous persons is an exceedingly difficult problem, owing to the chronic nature of the disease. The cases for isolation may be divided into two classes: (1) There is a comparatively small class who are actually ill and more or less bedfast. These should be isolated as near to their own homes as possible, and for this purpose, in a county area, pavilions attached to existing isolation hospitals are the most suitable. (2) The other class, which is a larger one, includes the more chronic cases, all of them ambulatory, and many able to do a variable amount of work. In a county area these will be best accommodated in a centrally-placed home or labour colony, incorporated in part of an estate where cases capable of undergoing arrest of the disease are also treated, and where the full rigid régime of a sanatorium would not be followed. At the present time the number of the more chronic cases isolated is small, and although in a county area very fair segregation may be attained, if the home conditions are good, under the supervision of the tuberculosis officer, county authorities undoubtedly require compulsory powers for the separation of persons who, after thorough investigation, are proved to be a danger to the public health.

The second method of attacking tuberculosis is indirect, and is based on the following factors, which govern not only the number but the results of all infections, tuberculosis, typhoid, influenza, or any other infective disorder—namely: (1) The nature of the soil in which the germ multiplies—*i.e.*, the natural or acquired degree of resistance

of the person attacked. (2) The amount of the dose of the germ which is the exciting cause of the disease. (3) The virulence of the strain of the germ which is absorbed by the individual.

All preventive measures, such as improved housing, proper ventilation and sunlight, abundant food, healthy occupations, and so on, are based on factors (1) and (2); they act indirectly, slowly but surely, towards the eradication, not only of tuberculosis, but all other infectious diseases.

The Arrest of Tuberculosis.

The problem of the cure of individual cases of tuberculosis is not so important as that of prevention of the disease.

Tuberculosis, and especially consumption, is an *exceedingly* difficult disease to arrest, unless it can be treated in the early stages. When the National Insurance Act drew special attention to tuberculosis, far too great emphasis was laid on the benefits, or supposed benefits, of sanatorium treatment. The popular view was that any case, no matter in what stage, had only to be sent to a sanatorium and all would soon be well. The use of the term "sanatorium benefit," which really covers all kinds of benefit for tuberculosis cases, is unfortunate. Because cases have been sent in the advanced stage of the disease to sanatoria instead of to hospitals for chest cases, and have not, of course, been "cured," public opinion is inclined to swing violently in the opposite direction, and to say sanatorium treatment in general is useless. This statement is equally wrong. I showed in my last annual report that, of 549 patients sent in the early stages of the disease to sanatoria, 80 per cent. were at work, or were fit for work, at times differing between six months and three years after they had left the sanatorium.

Sanatorium treatment should be regarded merely as one kind of institutional treatment. Institutional treatment for tuberculosis in a complete scheme dealing with tuberculous disease will be given in chest hospitals for pulmonary cases, general hospitals, sanatoria (adults and children), and labour colonies, and for the following classes of patients: (1) Early cases for a probable cure. (2) Doubtful cases of tuberculosis, for purpose of diagnosis. (3) Educational cases. These receive a period of treatment in order that, when they return home, they may apply the general hygienic principles taught them at the sanatorium. (4) Isolation cases. These are cases which receive institutional treatment in order to prevent the spread of the disease, and are usually advanced cases with home conditions which make proper domiciliary treatment impossible.

In any review of the curative results of schemes dealing with tuberculosis it is most important to remember that, even at the present time, the early cases applying for treatment are far outnumbered by

the late and intermediate cases. The following table shows that on the whole, since the establishment of the county dispensary organization, the present position is better than in 1914, but the late notification of patients, which is not peculiar to Lancashire, is a very serious source of dissatisfaction to all who are engaged in dealing with the disease. The remedy lies in the education of the public, together with increased vigilance among the doctors, and a more close co-operation between them and the tuberculosis officers.

TABLE SHOWING NUMBER OF PERSONS, SIXTEEN YEARS AND UPWARDS (INSURED PERSONS), EXAMINED AND REPORTED BY THE DISPENSARY OFFICERS TO BE SUFFERING FROM TUBERCULOSIS OF THE LUNGS, AND RECOMMENDED FOR TREATMENT.

Stage.	Year 1914.	Year 1915.	Year 1916.
Stage I.*	298=25.7 per cent.	434=32.3 per cent.	401=34.7 per cent.
Stage II.*	314=27.0 " "	466=34.7 " "	451=39.0 " "
Stage III.*	547=47.1 " "	426=31.7 " "	286=24.8 " "
Number taken out of above groups, as after further investigation diagnosis was not confirmed	—	17= 1.2 " "	17= 1.5 " "
Total	1,159	1,343	1,155

* Classified according to the system of Turban-Gerhard.

General Conclusions.

In all measures dealing with tuberculosis, emphasis should always be laid on prevention rather than the cure of the disease. The eradication of tuberculous disease is perhaps the most difficult task as yet attempted by preventive medicine. Short of complete isolation (which may be impossible) tuberculous disease will only be eradicated slowly. The best results will be obtained if there be concentration: (1) On the destruction of infected tuberculous cattle. (2) On the isolation, as far as possible, of tuberculous persons who are a serious danger to others. (3) On improvement in housing. (4) On education of the public as to the dangers of tuberculous disease, and how best to avoid tuberculous infection. (5) On a wider use by doctors of the free services for diagnostic purposes of the county staff appointed to carry out county schemes dealing with tuberculosis.

AN OPEN-AIR INDUSTRIAL EXPERIMENT FOR TUBERCULOUS CASES : THE HAIRMYRES COLONY, LANARKSHIRE.

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WITHIN the space of this article, it is only possible to give a short description of the Hairmyres Colony. It forms a part of the Tuberculosis scheme of the Middle Ward of Lanarkshire, and is designed to give prolonged treatment and education in an open-air employment to patients in residence in associated Sanatoria who give promise of making a complete recovery, and who are anxious to avail themselves of the special advantages it offers. The colonists will undergo a course of training, including work on the land, market-gardening, poultry and pig rearing, and forestry. The various institutions belonging to the Local Authority will provide a market for the produce. The Colony will also be a centre for the treatment and education of tuberculous children, medical and surgical. Further, there will be established at Hairmyres, a school of forestry, in association with the West of Scotland Agricultural College. The forest tree nurseries at Hairmyres, and the planting areas at Camps and Glengavel, some forty miles distant, will, it is anticipated, provide instruction for the students of forestry, and healthy and suitable employment for patients at the Colony. Some of the latter, also, may be expected to follow the complete course of training, and qualify as foresters. Apropos of this School of Forestry, it should be stated that owing to the steady increase of the population of the Middle Ward, the provision of a further water supply has become necessary. This has been secured by the acquisition of some 7,000 acres of water catchment area in the Leadhills uplands, situated some three miles from the village of Crawford. The valleys and hills of this area, with an elevation rising to some 2,000 feet, are to be planted, under the Afforestation scheme sanctioned by the Development Commissioners. At this hill station, it is proposed to erect accommodation for the forestry students and patients drafted from Hairmyres to work on the planting area.

The Colony and the Water Supply and Afforestation schemes are in essence distinct undertakings; they have been linked up, however, to the obvious advantage of the consumptive colony.

The Colony at Hairmyres extends to a little over 200 acres, more

and being available if needed. It is situated in an agricultural district, within easy access of Glasgow. The land is in good cultivation.

The buildings in course of construction consist of the following :

(a) For patients' accommodation—an administrative block, including dining-hall and nurses' quarters; a male pavilion for 48 patients, a female pavilion for 48 patients, a children's pavilion for 48 patients, an open-air school, and an Observation block for 12 patients, male and female. The pavilions are of two stories, arranged so as to divide the patients into four units of 12. There is a sitting-room for each unit.

(b) Laundry and power station, with steam generating, and electric light plants.

(c) Farm buildings, consisting of a double byre for cows, calf house, dairy, stable and pigery.

All these buildings are substantial and permanent in character. They are constructed with hollow brick walls, harled outside, with the exception of the farm buildings. The patients' blocks face south, and are of the usual sanatorium type, in general appearance recalling the pavilions of the Royal Victoria Hospital, Edinburgh. To the south of this group of buildings will be the poultry farm, with incubator house and rearing shed. Adjoining it will be the garden, equipped with tomato house, rhubarb forcing cellar, potting shed and workshop. Drainage will be by septic tanks. The approximate cost of establishing the Colony at Hairmyres was estimated at £65,000, but owing to the increased cost of labour and material, the capital expenditure will work out probably at some £100,000. At the present time it is under construction. Many of the buildings are well advanced, and it is already possible to form a good idea of the scheme as projected. The forest nursery of nine acres has been established, and is managed by a resident forester, with the help of local labour. At the date of my visit (July), a party of young women were engaged in weeding the great beds of one and two year old coniferae. The work impressed me as both interesting and suitable for consumptive patients. The Colony farm is under the direction of an experienced farmer, the raising of pigs and the production of milk being at present the main sources of income. When the Colony is fully established, each department will be staffed with a trained foreman instructor.

At the hill station beyond Crawford, perhaps the chief interest at the moment is the settlement of German prisoners, and their work on the dam across the mouth of the valley which is to form the great natural reservoir. The little village of huts for the prisoners and their guards are the nucleus of the forest station of the future.

Several acres of healthy young forest trees on the neighbouring hill-sides tells us that the work of afforestation has begun. The planting, fencing, and the general tending of the 7,000 acres of this area will take

the workers far into the hills; they will live in temporary encampments, often far from their base. They will be in the typical mountain country of the Scotch lowlands, remote from town or village. In the valleys are a few scattered farmsteads, whose chief care is the sheep, which roam the lower ranges of the hills. The higher levels are the home of the grouse, black game, and mountain hare. To the man with any instinct for nature, one can imagine few lots more happy than that of the forester on these hills. For the more robust patients, the settlement at Crawford will provide a centre of after-care altogether unique in this country.

This brief sketch is quite inadequate to convey the impression which one carries away from a visit to Hairmyres and Crawford. The scheme bears the impress of whole-hearted solicitude for the consumptive workers in the great industrial district it will serve. In its general conception, alike as in its detailed elaboration, it is marked by breadth of vision and enthusiasm. As a contribution to the subject of the administrative control of tuberculosis, the experience of Hairmyres will be invaluable. It is indeed a noble experiment. One can but wish for it a commensurate success.

I welcome the opportunity of thanking the District Committee of the Middle Ward of the County of Lanark for the courtesy shown to me during my visit, and for permission to write this brief account of their undertaking. In particular, I am indebted to Mr. George Fraser, Chairman of the Committee; Dr. John T. Wilson, M.O.H.; Mr. W. E. Whyte, District Clerk, and Dr. Macpherson, Medical Superintendent of the Colony.

INSTITUTIONS FOR THE TUBERCULOUS.

DARTMOOR SANATORIUM, CHAGFORD, DEVON.

AMONG the numerous private sanatoria which justly enjoy extensive popularity, the Dartmoor Sanatorium must be accorded a prominent place. Its ideal situation among the moorlands of the west country, far from war's alarms, and surrounded by some of the most delightful districts of Devon, makes this centre a particularly desirable one at the present time. The sanatorium was opened in 1903, and as there is only accommodation for twenty-five patients, such individual attention as is essential for successful treatment is assured, and also the institutional character of the establishment is reduced to a minimum. The



GENERAL VIEW OF DARTMOOR SANATORIUM, CHAGFORD, DEVON.

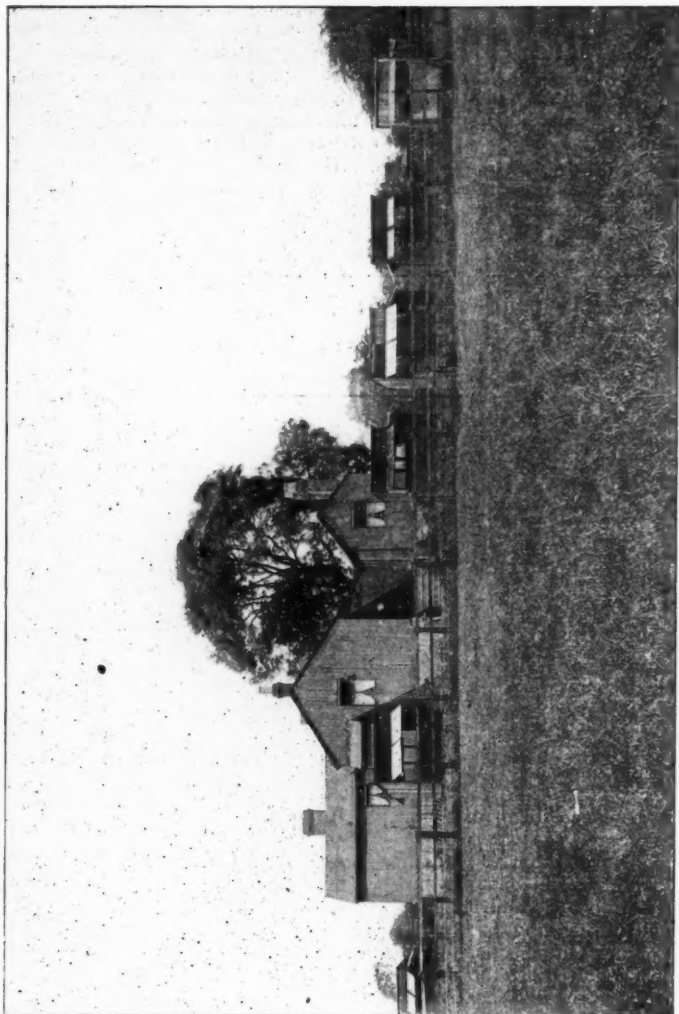
sanatorium is conducted on scientific principles; patients are not expected to eat more than they can digest, and hard-and-fast rules are avoided as far as is consistent with efficient management. Treatment with tuberculin is recommended only in suitable cases. The sanatorium stands at an elevation of more than 700 feet above sea-level, in its own grounds, which are about 18 acres in extent, and situated amidst some of the finest mountain and moorland scenery to be found in Britain. Though near the moor, the sanatorium is well sheltered from prevailing winds owing to the lie of the country and the wooded nature of the immediate vicinity. The rooms are lit by electricity, and are heated on

the low-pressure hot-water system. The walks are many and varied, both as regards direction and slope, and offer full opportunities for graduated hill-climbing; the tors in the near neighbourhood range from 800 to 1,400 feet in height. Recreation is amply provided for by a good croquet-lawn, golf-putting course, full-sized billiard-table, etc., and a pony and trap are kept for the convenience and pleasure of the patients. The terms range from four to six guineas per week, according to the size and position of the patient's room; drugs and laundry are, of course, treated as extras. The establishment is under the direct control of the resident physician, and fully staffed with experienced nurses. A motor can be sent to meet patients on arrival at Exeter (L. and S.W.R. and G.W.R.), which is 20 miles distant; Okehampton (L. and S.W.R.), 12 miles distant; or Moreton-Hampstead (G.W.R.), 6 miles distant; patients can reach the sanatorium within $4\frac{1}{2}$ hours of leaving London. Both ladies and gentlemen are received, and for patients with literary or artistic tastes, and desiring the benefits of one of the most charming districts of the west country, the Dartmoor Sanatorium will be found all that could be desired. Full particulars may be obtained on application to the resident physician, Dr. C. H. Berry, at the sanatorium (Telephone: Chagford 11).

THE LONG EATON SHELTER COLONY, DERBYSHIRE.

DR. SIDNEY BARWISE, County Medical Officer for Derbyshire, in his recently-issued "Report on Work Done for Combating Tuberculosis," provides an instructive illustration of a simple, effective, and inexpensive Shelter Colony which has recently been established at Long Eaton. We desire to draw attention to this sensible experiment, believing that it may serve as a useful model which may well be imitated. There is accommodation for seven patients. The scheme entailed an expenditure of about £65 per annum. Some of the patients leave their shelters to engage in work during the day. Dr. Barwise suggests that where any Care Committee or District Council can make arrangements for the segregation of ten patients in shelters, the Tuberculosis Committee should be at least responsible for providing a suitable caretaker. There are, it would seem, legal difficulties which must be faced in an experiment of this kind, and before anything is attempted the approval of the Local Government Board must always be obtained. The after-care of the consumptive is certainly a difficult problem. As far as insured persons are concerned, the Insurance Committee have a small amount of money which they can spend in giving extra nourishment, but a similar fund is required for non-insured persons. The patients for whom this extra nourishment is most required are those who have been in the sanatorium and have returned to the dispensaries for further treatment, but are still unable to work. If these patients could continue to carry out open-air treatment, living in shelters while they receive tuberculin or other treatment at the nearest dispensary, the prospect of the disease becoming eventually arrested would be increased. Dr. Barwise suggests that the

cost of assisting patients to live in a shelter colony should be defrayed by 50 per cent. of the cost being borne by the County Council, half of which should be recovered from the Local Government Board, 25 per



THE TUBERCULOSIS SHELTER COLONY, LONG EATON, DERBYSHIRE.

cent. by the District Council, and 25 per cent. by the voluntary committees, who should, of course, receive the contributions from the Insurance Committee for insured patients.

NOTICES OF BOOKS.

A CLINICAL TREATISE ON TUBERCULOSIS.

DR. F. M. POTTENGER, the well-known head of the Pottenger Sanatorium at Monrovia, in California, has accomplished a notable service by the publication of his monumental study of the clinical features of tuberculosis in two bulky volumes.¹ It is a production of which we may well be proud, and we gladly offer him our warm congratulations. The work is one which should be in the possession of every tuberculosis officer, all medical superintendents of hospitals and sanatoria caring for tuberculous subjects, and every adviser having to deal with the clinical side of tuberculous disease. Dr. Pottenger rightly contends that if we are to make progress in our knowledge of tuberculosis and advance in practical measures for its prevention and arrest, we must take a broader view than that expressed by the prevalent idea that this disease is due to the tubercle bacillus which produces a group of tubercles in the lung, and can be cured by good food and open air. "We must look upon it as being an infectious disease producing inflammatory processes in some organ, or organs, of the body, but indirectly influencing every organ and cell of the body; and prior to the time that a specific cure has been found, we must look upon treatment as being the application of a sufficient number of remedies and measures to raise the patient's defensive powers sufficiently high to destroy the tubercle bacilli and to furnish the focal stimulation necessary to hasten scar formation." Dr. Pottenger has approached his task in a truly scientific spirit. He has made anatomy and physiology, both normal and pathological, the bases of his work, and has given to visceral neurology the special attention it deserves. The treatise is not only based on wide reading and an intimate knowledge of the best work of the most reliable authorities on the subject, but it is founded in great measure on twenty years of painstaking clinical study undertaken for the most part in the sanatorium of which the author is Director. Dr. Pottenger has evidently had opportunities of studying all classes of tuberculous disease, for he says: "My patients have

¹ "Clinical Tuberculosis," by Francis Marion Pottenger, A.M., M.D., LL.D., Medical Director, Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California; Professor of Diseases of the Chest, College of Physicians and Surgeons, Medical Department, University of Southern California, Los Angeles, California. With a chapter on Laboratory Methods by Joseph Elbert Pottenger, A.B., M.D., Assistant Medical Director, and Director of the Laboratory Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California. Vol. I.: Pathological Anatomy, Pathological Physiology, Diagnosis, and Prognosis. Pp. 707, with 105 text illustrations and charts, and 6 plates in colours. Vol. II.: Complications and Treatment. Pp. 713, with 62 text illustrations and charts, and 4 plates in colours. Published by Henry Kempton, 263, High Holborn, W.C. 1; and 40 and 42, University Avenue, Glasgow, 1917. Price £3 3s. net.

represented all stages and phases of the disease. For the most part they have been suffering from advanced, widespread lesions. They have been of an unusually intelligent class, and this has added greatly to the opportunity for careful study." Dr. Pottenger has gained for himself a prominent position as a scientific, far-seeing, cautious, original investigator of tuberculosis and a clinician of wide experience and sound judgment, and his great work fully establishes his reputation as one of the most reliable and serviceable of living authorities on tuberculosis. In his work all aspects of the clinical study of tuberculosis are considered. Much space is devoted to phthisiogenesis viewed from the standpoint of tuberculous infection in childhood. Special attention is directed to a consideration of the rôle of the nervous system, and particularly to its relationship to the occurrence of fever. Methods of physical examination are described in detail. Symptomatology is dealt with most fully. The greater part of the second volume is devoted to questions of treatment, and here the author's wide knowledge and sure judgment are conspicuous. Special chapters are devoted to the consideration of the influence of open air, climate, food, tuberculin, psychotherapy, hydrotherapy, heliotherapy, artificial pneumothorax, and the relation between physician and patient. There are also excellent sections on pharmacopoeial remedies, home treatment, sanatorium management, and prophylaxis. The concluding division of this monumental work contains interesting records with charts of many cases which have been under the author's care. The work throughout is well arranged and got up in first-class form, and there is a good index. Dr. Pottenger and his colleagues deserve warm congratulations on the successful accomplishment of a wisely planned and skilfully accomplished task, which will be of immense value to all medical practitioners engaged in services making for the prevention and arrest of tuberculosis.

FIRE PREVENTION AND PROTECTION.

Fire is a risk which should always be considered and prepared for in every hospital and sanatorium. In only too many existing institutions measures for fire prevention and protection are inadequate. This important matter deserves the serious consideration of all committees of management. We would direct the attention of superintendents of hospitals and sanatoria to Dr. Eichel's recently issued valuable brochure.¹ It is planned for the use not only of superintendents and boards of managers, but for the service of inspectors, architects, builders, and others who have occasion to consider the fire problem in hospitals and similar establishments. Although written primarily for use in the United States of America, the information provided will be of much practical assistance in this country. Descriptions are given of the Common Hazards met with in Hospitals, and directions as to the selection and use of fire Appliances and Safeguards. The recommendations are thoroughly serviceable, and the suggestions for organization

¹ "A Manual of Fire Prevention and Fire Protection for Hospitals." By Otto R. Eichel, M.D., Director, Division of Sanitary Supervisors, New York State Department of Health. Pp. v + 69. New York: John Wiley and Sons, Inc., 432, Fourth Avenue. London: Chapman and Hall, Ltd. 1916. Price \$1.00 net.

of a Hospital Fire Department will prove of real assistance. We hope Dr. Eichel may be induced to expand his handbook into a more detailed and fully illustrated volume.

PULMONARY TUBERCULOSIS.

Dr. W. M. Crofton has written an excellent manual on general principles and essential practices which should guide and govern the medical practitioner in the management of cases of tuberculosis of the lungs.¹ It is a book which every doctor will do well to peruse, and it may be commended especially to the notice of all tuberculosis officers and others called to advise in regard to the care and control of consumptives. The volume opens with a concise bacteriological introduction and a description of anatomical and physiological features. There is a good chapter on methods of infection and the pathological changes occurring in the lungs and in the blood and tissue fluids. The major part of the book is devoted to a serviceable exposition of the principal facts and direction of principles governing diagnosis, prophylaxis, and treatment both special and general. An appendix affords information as to the manufacture of vaccines. There are a number of instructive illustrations, including several interesting radiograms. The book is evidently based on extensive study and first-hand experience, and will be much appreciated by those who desire up-to-date information and reliable guidance in a concise and condensed form, and such as will be of real value in actual practice.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Dr. Charles Porter, Medical Officer of Health for the Metropolitan Borough of St. Marylebone, has written a compact and up-to-date manual on the Elements of Hygiene and Public Health which may be thoroughly recommended to all practitioners and students of medicine.² The work, indeed, has been specially planned to meet the needs of the hard-worked student and busy doctor, and in its arrangement, form of presentation, and substance matter, admirably fulfils its purpose. The essential facts and governing principles relating to the preservation of health and the prevention of diseases are lucidly presented, and in a manner which is interesting and yet serviceable. There are numerous excellent illustrations. Tuberculosis is dealt with at some length. It is shown that in England and Wales alone phthisis kills something

¹ "Pulmonary Tuberculosis: its Diagnosis, Prevention, and Treatment." By W. M. Crofton, M.D., Lecturer in Special Pathology, University College, Dublin; Visiting Physician, Royal National Hospital for Consumption. Pp. vi + 122, with coloured frontispiece and 20 illustrations. London: J. and A. Churchill, 7, Great Marlborough Street. 1917. Price 6s. net.

² "Elements of Hygiene and Public Health: A Textbook for Students and Practitioners of Medicine." By Charles Porter, M.D., B.Sc., M.R.C.P.E., of the Middle Temple, Barrister-at-Law, Medical Officer of Health, Metropolitan Borough of St. Marylebone; Examiner in Public Health, University of Edinburgh, etc. Pp. xiv + 411, with 98 illustrations. London: Henry Frowde, Oxford University Press, Falcon Square, and Hodder and Stoughton, Warwick Square, E.C. 1917. Price 12s. 6d. net.

like ten or twelve persons annually out of every 10,000, and the other forms of tuberculous disease eight or nine per 10,000. During 1913 there were notified in England and Wales no less than 96,533 cases of pulmonary tuberculosis and 38,190 cases of other varieties of tuberculous disease, equal respectively to 2.64 and 1.14 per 1,000 persons living. "In addition to being the most fatal of diseases, tuberculosis, the pulmonary form particularly, causes a great deal of disablement and suffering. It shows a distinct preference for males, something like four more males than females dying annually per 10,000." With regard to bovine tuberculosis, it is stated that "somewhere between 15 and 30 per cent. of carcasses examined after slaughter have been found to be tuberculous," and "in some districts as many as 13 per cent. of the milks examined have been found to contain tubercle bacilli." Dr. Porter indicates how the medical practitioner may best co-operate with the available organizations in dealing with tuberculous subjects and in spreading reliable knowledge regarding effective prophylactic measures.

A new edition has just been issued of the well-known manual of "Hygiene and Public Health" which bears the names of Sir Arthur Whitelegge and Sir George Newman.¹ The work has been thoroughly revised and brought up to date by Sir George Newman, and a number of fresh illustrations have been introduced. The application of the scientific methods of preventive medicine in relation to tuberculosis is well brought out. A special section is devoted to the consideration of tuberculosis, and furnishes a remarkably concise and yet comprehensive presentation of the essentials of the subject. Of pulmonary tuberculosis it is stated that "it is a true infective disease, but only a sub-infectious one." The tuberculosis dispensary is said to possess six functions: (1) "Receiving-house and centre of diagnosis; (2) clearing-house and centre for observation; (3) curative centre; (4) clinic for examination of contacts; (5) after care; (6) information bureau." There is also a useful section on sanatoria, which contains much practical information. The book is an admirable handbook for all officers and workers engaged in every form of service for health betterment.

¹ "Hygiene and Public Health." By Sir Arthur Whitelegge, K.C.B., M.D., B.Sc., F.R.C.P., D.P.H., and Sir George Newman, M.D., D.P.H., F.R.S.E. Thirteenth edition, revised and enlarged. Pp. xi+796, with 77 illustrations and diagrams. London: Cassell and Company, Ltd., La Belle Sauvage, Ludgate Hill, E.C. 4. 1917. Price 10s. 6d. net.

PREPARATIONS AND APPLIANCES.

REQUISITES FOR THE SANATORIUM AND ITS PATIENTS.

MANY of the preparations and appliances formerly found in sanatoria and dispensaries, and used both in public medical services and in private practice in dealing with tuberculous cases came to us from Germany and Austria. It is now well to realize that practically all necessary requisites for the sanatorium and its patients are being manufactured in this country. Reference may be made to a few preparations and appliances likely to be of special service. SPUTUM FLASKS, until recently, were introduced to this country in large numbers from Central Europe. It is good to know that excellent forms of spitting flasks are now being made in this country. For many years admirable flasks for the collection of expectoration have been manufactured by Messrs. Beatson, Clark and Co., Ltd., the well-known firm of medical glass manufacturers.¹ For effectiveness, economy, and general convenience, these receptacles cannot well be beaten. Tuberculosis officers and medical superintendents of sanatoria will be wise to make full tests of these British-made sputum flasks.

The valuable nutrient and tonic preparation SANATOGEN is now being manufactured in this country and supplied by an all-British company.² The same firm is supplying ALBULACTIN, a reliable preparation of milk albumin obtained from cow's milk. It is very useful in dealing with certain difficult cases of gastro-intestinal disorder not infrequently met with in sanatorium practice. It will also be found of service in dealing with certain cases of tuberculosis in infancy and childhood. The same firm is now providing FORMAMINT, well-known as an admirable and particularly pleasant form of throat tablet. This antiseptic and soothing preparation is not only a useful prophylactic, but an effective therapeutic agent in dealing with various forms of catarrhal pharyngitis, tonsillitis, and irritation of the mucous membrane of the throat so commonly met with in large numbers of tuberculous subjects.

Among not a few tuberculous women dysmenorrhœa is met with. This distressing condition of menstrual pain can be much relieved by the administration of PHENALGIN.³ For certain forms of headache, neuralgia, insomnia, and as a general antipyretic and anodyne, Phenalgin has won much favour. It is apparently free from depressing action

¹ Full particulars, with illustrations and quotations will be sent on application to Messrs. Beatson, Clark and Co., Ltd., Rotherham, Yorkshire.

² Sanatogen, Albulactin and Formamint are now being supplied by a British company the chairman of which is Lady Mackworth, Genatosan, Ltd., 12, Chenies Street, London, W.C. 1; and on application specimens of these preparations and full particulars will be sent to any medical practitioner.

³ Specimens and particulars of Phenalgin may be obtained from the manufacturers, Messrs. E. T. Pearson and Co., Ltd., 199, London Road, Mitcham, Surrey.

on the cardiac and respiratory mechanisms, and is said not to induce any drug habit.

Under the designation of "ALDEMINT" Messrs. Southall Bros. and Barclay, Ltd., have introduced a very palatable and efficient form of throat tablet which not only is of service as a prophylactic, but is a soothing aromatic germicide in cases of catarrhal conditions of the throat.¹ It will be found useful in dealing with some cases of offensive breath.

Messrs Boots, Ltd., are now supplying a series of hygienic and sanitary preparations which admirably meet the many and varied needs of sanatorium patients.² Among the new preparations prominence may well be given to CHLORAMINE-T. This new antiseptic (*p*-toluene-sodium-sulpho-chloramide), introduced by Dr. H. D. Dakin and his colleagues at the University of Leeds, is practically non-toxic and does not coagulate blood-serum. It is also stable both in powder form and in solution. It is available in convenient tablets, one of which with 2 ounces of water makes a 1 per cent. solution, which makes a good nasal douche or mouth wash. This agent will be found of much service in sanatorium work. The same firm has introduced "HALAZONE" (*p*-sulphondichloraminobenzoic acid) in tablet form, for the disinfection of drinking-water. Each tablet contains four milligrammes of Halazone, said to be usually sufficient to sterilize a quart of contaminated water.

"Lysol" is a valuable cresylic acid disinfectant. It was originally introduced to this country from Germany. An excellent British-made form of this useful germicide is now being made by Messrs. Southall Bros. and Barclay, Ltd., of Birmingham, under the name of "LYCRESOL." This is a powerful disinfectant and antiseptic. As a deodorant and cleansing agent it is of much service, as with water it forms a clear saponaceous solution. It is an excellent agent for use with sputum flasks and in sanatorium service generally.³

The Peace Pillow Company have introduced a number of appliances which have proved serviceable in sanatoria and for patients undergoing open-air treatment; and among them we would direct attention to the "LINSASHA" PUFF AND FACE LEATHER.⁴ This dainty little pocket companion is about $2\frac{1}{2} \times 2\frac{1}{2}$ inches in size and weighs an ounce. It is a compact toilet puff with white cream or rose sanitary powders and interleaved with face leather. By its use the irritation and undesirable effects of exposure on the skin can be mitigated. Ladies will welcome it and men will find it useful, especially after shaving.

The open-air life is not without its difficulties and drawbacks, and not the least of these arise from the presence and irritation of flies. As carriers of disease flies play an important part in the spread of certain diseases. Flies often gather about sputum receptacles and may carry

¹ Specimens and particulars of "Aldemint" may be obtained on application to Messrs. Southall Bros. and Barclay, Ltd., 19-21, Lower Priory, Birmingham.

² Literature regarding and samples of Chloramine-T and "Halazone," and other preparations suitable for sanatorium practice, may be obtained on application to Boots Pure Drug Co., Ltd., the Laboratories, Nottingham.

³ Particulars and specimens of "Lycresol" may be obtained on application to Messrs. Southall Bros. and Barclay, Ltd., 19-21, Lower Priory, Birmingham.

⁴ The "Linsasha" Powder Puff can be obtained in quantities at 54s. per gross from the manufacturers, The Peace Pillow Company, 17, Manchester Avenue, Aldersgate Street, E.C. 1; or from chemists, etc., at 6d. each.

tubercle bacilli. Messrs. Lawson and Co. (Bristol), Ltd., have introduced an excellent form of FLY SPRAY which should do much to lessen the plague of flies.¹ The preparation can be used with an ordinary sprayer. The spray should be distributed over manure heaps, rubbish tips, and all breeding-places of flies. The same firm also provide WOOD OIL EMULSION and CARBO-FLY. For use in children's sanatoria PARA-QUIT will be found useful; it is an excellent means for keeping children's heads clean and free from pediculosis.

Messrs. Heppell and Co. have also published an illustrated brochure on "Foes to National Health and Economy; or, Insect Pests and How to Exterminate Them," which we commend to the notice of all medical practitioners.² This firm also has introduced a series of reliable anti-parasitic preparations. "PARASITOX" is a solid compound in a form closely resembling the modern shaving-soap stick. To repel the attacks of mosquitoes, flies, and other winged pests the preparation is applied lightly to the exposed skin. To kill lice and other body parasites it can be rubbed into the clothing. CRUDE INSECTOX is a form of liquid insecticide which is sold in bulk for use in military and similar work. It is effective and economical, and is being extensively employed at home and abroad.

A new form of the NASAL COMPOUND ASEPTOIDS according to Dr. Macnaughton-Jones's formula has been introduced by Messrs. Oppenheimer, Son and Company, Ltd., which will be found an effective soothing alkaline antiseptic preparation for the treatment of morbid conditions of the nose and throat by spray, gargle, or douche.³

It is becoming increasingly clear that if tuberculosis is to be eradicated greater heed will have to be given to the all-important matter of the housing of the people. The tuberculosis problem is to a large extent a housing problem. We therefore think it well to direct attention to the highly suggestive series of plans and notes which have recently appeared under the heading of "The Problem of the Small Dwelling and its Solution" in the *Building News*. These important contributions are the work of Mr. Robert Thomson, and deserve fullest consideration.⁴

¹ Full particulars regarding the Lawson Anti-Fly and Anti-Parasitic preparations may be obtained on application to Messrs. Lawson and Co. (Bristol), Ltd., St. Philip's, Bristol.

² Copies of "Foes to National Health and Economy" (price 3d.) and full particulars regarding insecticide preparations may be obtained on application to Messrs. Heppell and Co. (J. E. Jewell, M.P.S.), Insectox Laboratories, 2, Eden Street, Hampstead Road, London, N.W.

³ Full particulars regarding the "Aseptoid" Products can be obtained on application to Messrs. Oppenheimer, Son and Company, Ltd., 179, Queen Victoria Street, London, E.C.

⁴ Mr. Robert Thomson's articles and plans appeared in the *Building News* for June 6, 13, 20, and 27; July 4, 11, 18, and 25; August 1, 8, 15, and 29; September 5 and 19.

THE OUTLOOK.

THE BRITISH JOURNAL OF TUBERCULOSIS.

THE BRITISH JOURNAL OF TUBERCULOSIS with this issue completes its eleventh volume. Established long since in days of peace, it has served as a means for the presentation of the best opinions regarding all aspects of the tuberculosis problem, and it has provided an organ for the publication of the results of much valuable original research. Prior to the outbreak of war it had been hoped that it would be possible to enlarge the journal and to extend its scope and increase its powers for service. But with the coming of war many difficulties have had to be faced, and restriction rather than expansion has governed action. During the last three years an endeavour has been made to provide information and indicate practical paths of progress, so that even amidst the anxieties and activities of these unexampled days of conflict the Tuberculosis Movement shall not suffer serious retrogression. It cannot be denied that existing war conditions have seriously affected advancement. Medical Officers engaged in various forms of tuberculosis work have been withdrawn, schemes for dealing with the tuberculosis problem have had to be hung up, financial support has been diverted into other channels, inquiries and investigations and original researches have been deferred, and the thoughts and actions of all sorts and conditions of persons formerly interested in the prevention and arrest of tuberculosis have been diverted into war service. And yet, rightly viewed, Tuberculosis Prophylaxis, and Treatment, even in war days, have to be reckoned as matters of paramount importance if the health and well-being of the people are to be maintained. Large numbers of tuberculous men have been admitted into the services, and large numbers have been invalided in consequence of the development of active tuberculous disease. Among munition and other workers considerable numbers of adolescent boys and girls have fallen victims to tuberculosis. Even hardened adult workers, under the extra stress and strain of recent times, have succumbed to the tuberculosis foe. And in the homes of the people under non-hygienic conditions arising from overcrowding, unusual restrictions regarding darkening of habitations, difficulties in connection with food, the depressing influences of anxiety, sorrow, and bereavement, and profound alteration in personal habits and general outlook, tuberculosis has claimed many victims.

It must be remembered, also, that at the close of the war it is probable that conditions, economic, industrial, hygienic, and the like, will be such as may act as predisposing influences in the development and spread of tuberculosis. Moreover, it should not be forgotten that not a few British prisoners are going under with tuberculosis, and it is to be feared that when at the close of the war large numbers of broken men return to their own home the Captain of the Men of Death will claim many as his captives. To speak plainly, the position

is such that, as a people, we cannot afford to forget the presence of tuberculosis in our midst, and it will be a criminal neglect if we fail to make provision for dealing adequately with the situation. We have repeatedly urged in this journal the importance of establishing a representative Committee or authoritative Commission to consider the whole tuberculosis problem in relation to war and probable after-war conditions. If a Ministry of Health existed a Tuberculosis Department would naturally be formed to deal with this matter. Meanwhile it is to be hoped that the Local Government Board will constitute a special department for dealing with all aspects of the tuberculosis problem. This country is not lacking in pathological and clinical experts, and their services should be secured and effectively used. It is unfortunate that much time and numerous opportunities for dealing adequately with this question have been lost. Among the positive mistakes which have been permitted, none is more to be deplored than the action which has led to the discharge of large numbers of tuberculous men from the Army without adequate provision for their proper treatment or reasonable guarantee that they will not become the centre of danger and disaster in their own families and risk and loss to the community generally. The difficulties of the situation are certain to increase, and at the close of the war the tuberculosis question is likely to assume such proportions that the nation will insist on action. It is therefore most desirable on all grounds that the tuberculosis problem should receive continuous study by a permanent staff of experts, and that Commissioners should be appointed at once to obtain the fullest possible information as to the best way in which the difficulties and dangers of the present may be met and solved, and how the greater difficulties and dangers which threaten to arise in the near future may be avoided.

TUBERCULOSIS AND PUBLIC HEALTH.

In the latest report of the Local Government Board,¹ there is a section dealing with tuberculosis in England. Up to March 31, 1917, there had been approved under the National Insurance Act, 1911, 291 residential institutions containing 11,883 beds for the treatment of tuberculosis. Of this number 138 institutions, containing 6,064 beds, had been provided by local authorities, and 153 institutions, containing 5,819 beds, by voluntary bodies. In addition there were 370 dispensaries for the treatment of tuberculosis, of which 337 had been provided by local authorities. It is stated that experience has shown that the accommodation provided in residential institutions is insufficient to meet the demand for beds for advanced cases, and notwithstanding the difficulties created by the war and the restrictions on capital expenditure, it is good to know that some little additional accommodation is being provided for this purpose, the expenditure being charged to revenue account. A few proposals are also under consideration for the provision of additional residential accommodation for

¹ Forty-Sixth Annual Report of the Local Government Board, 1916-1917. Part I.—Administration of the Poor Law: Special Work arising out of the War. Part II.—Housing and Town Planning. Part III.—Public Health: Real Taxation and Valuation. Pp. 59. London: H.M. Stationery Office, Imperial House, Kingsway, W.C. 2. 1917. Price 3d. net.

children suffering from tuberculosis; and there is evidence that further provision is needed for the treatment of non-pulmonary tuberculosis both in children and adults. In accordance with the arrangements referred to in the previous Report, up to March 31, 1917, 487 applications had been received from persons not insured under the National Insurance Acts who were about to be discharged from the Army or Navy on account of tuberculosis and who were unable to obtain sanatorium treatment at their own expense. In all cases arrangements were made for the necessary treatment in residential institutions, either by the local authority in whose area the patient resided before enlistment, or, in exceptional cases, directly by the Local Government Board. Additional institutions have been taken over temporarily by the military authorities for use as hospitals. The Adults' Pavilion at the new sanatorium of the Huddersfield Town Council at Bradley Gate has recently been completed, and been transferred to the military authorities for use as a temporary War Hospital. The Liverpool Town Council have also agreed to place at the disposal of the War Office the Nurses' Home and the Children's Pavilion at the new sanatorium which the Council are erecting at Fazakerley. Consent has also been given conditionally to the military occupation of the Old Killingbeck Hospital belonging to the Leeds Town Council at which sixty beds were available for the treatment of tuberculosis, and the Town Council have, in consequence, provided additional accommodation for tuberculous patients in pavilions at the Seacroft Isolation Hospital. The Balby Hospital of the Doncaster Town Council, which was in use as a tuberculosis hospital, has also been lent to the military authorities.

AMERICA AND TUBERCULOSIS.

The United States of America, through its State Departments, National Association for the Study and Prevention of Tuberculosis, and other public and voluntary organizations, have for long been active, not only in encouraging research regarding tuberculosis, but in developing measures for the prevention of the disease and means for the efficient treatment of tuberculous sufferers. And now, in view of war conditions, America is facing the tuberculosis problems with scientific precision and a thorough recognition of individual and national needs and responsibilities. Dr. Hermann M. Biggs contributes a particularly notable article on "A War Tuberculosis Program for the Nation" to the July number of *The American Review of Tuberculosis*. Some of the points brought out in this valuable pronouncement may here be referred to. At the beginning of the war there were only 1,000 sanatorium beds in the whole of France for tuberculous cases, and these were in private institutions. The general death-rate from tuberculosis was nearly 3 per 1,000, and in many of the cities it was much higher. "With pulmonary tuberculosis thus widely disseminated in the general population, France mobilized a great army with great rapidity and without physical examination of those enrolled. Under the stress of the situation such examinations were impossible, and consequently a large number of early, latent, and arrested cases of pulmonary tuberculosis were mobilized. Many men thus enrolled in the army rapidly

developed pulmonary tuberculosis in the preliminary training camps, while still more broke down with active disease when subjected to the strains and hardships incident to life at the front." The insanitary conditions of the soldier's life are graphically described, and it is stated that by February of this year about 150,000 cases of tuberculous disease had been returned to their homes with active tuberculous disease, and "more are constantly being discharged for this cause."

It is interesting to find that Dr. Biggs expresses the following opinion regarding our own country: "England alone has not suffered to any great degree, and this is because, first, of the low prevalence of the disease in the civil population of England previous to the war; second, because the army was mobilized deliberately, and careful physical examinations were made, and those applicants who had suspicious histories or signs were excluded; and, third, because the English troops lie under distinctly better conditions at the front than do the French, because as a nation they are fond of fresh air and outdoor life." It is also said that "there are now between 350,000 and 400,000 French prisoners of war in Germany. It seems wholly conservative to estimate that at least 5 or 6 per cent. of these are suffering from tuberculosis (the French estimates run as high as 30 or 40 per cent.)." Dr. Biggs thinks that there will be "probably not far from 500,000 cases of tuberculosis in France to be dealt with if the war were to be terminated at once." Dr. Biggs contends that "it is not, therefore, because measures for the prevention of tuberculosis are wanting or inefficient that tuberculosis has become such a serious problem in so many European countries; it is simply because the well-tried measures have not been applied, both before and since the outbreak of the war, in an efficient way."

America is determined to learn by the mistakes of Europe. The National Association, at the request of the Council of National Defence, has appointed a special Committee to work with the War and Navy Departments of the Government, and with the anti-tuberculosis agencies of the country, in devising and executing a war scheme for the prevention and control of tuberculosis. The Committee came to the conclusion that much-needed assistance would be available "if the services of voluntary experts in tuberculosis were employed in various parts of the country in the examination of those recruits for the army who show any signs or symptoms suggestive of pulmonary disease, or in whom the history indicates its possible existence." The Committee recommended that the expert should make an examination of the following classes before an applicant is enrolled: (1) Every man whose history shows that he has at any previous time had any illness resembling in character pulmonary tuberculosis. (2) Every man who gives a history at any previous time of an attack of pneumonia or pleurisy. (3) Every man whose history shows that one or more members of his immediate family (father, mother, brother, sister, etc.) has had pulmonary tuberculosis, or died of this disease. (4) Every man with a flat chest whose weight as compared with his height is 15 per cent. below the normal. (5) Every man who gives a history of chronic catarrh or who has a cough or any symptom of any disease in the chest. (6) Every man in whom any abnormal physical signs of any kind are found in the chest. Dr. Biggs' serviceable article deserves to be studied in its entirety by

all medical officers of health and tuberculosis officers in this country. It is good to know that American tuberculosis experts are now going to the help of France. The American Red Cross and the Rockefeller Foundation have joined hands in this noble enterprise. The International Health Board of the Rockefeller Foundation has completed arrangements. The commission will be headed by Dr. Livingston Farrand, president of the University of Colorado and for ten years the organizer and executive secretary of the National Association for the Study and Prevention of Tuberculosis. As associate directors, Dr. Farrand will be accompanied by Dr. James Alexander Miller, of New York; Mr. Homer Folks, of New York; and Professor Selskar M. Gunn, of Boston. Herman G. Place acts as secretary to the director. Dr. Miller, who will take charge of those phases of the work relating to medical relief, is professor of clinical medicine in Columbia University, director of tuberculosis work of Bellevue Hospital and president of the Association of Tuberculosis Clinics in New York City. Mr. Homer Folks is the secretary of the New York State Charities Aid Association, and has, for many years, been prominent in modern health legislation and its application. He is a member of the Public Health Council of New York State and a former president of the National Association for the Study and Prevention of Tuberculosis, as well as of the National Conference of Social Work. In addition to his connection with the commission, Mr. Folks will take charge of the tuberculosis relief work of the American Red Cross in France, and thus assure complete co-operation. Professor Selskar M. Gunn holds a professorship in the Massachusetts Institute of Technology, is the secretary of the American Public Health Association, and editor of the *American Journal of Public Health*. He has had long experience in public health administration and in the working out of the new health laws of Massachusetts. His work in France will be specifically to take charge of the educational campaign which the commission proposes to inaugurate. We congratulate our American colleagues on this praiseworthy endeavour, and could have wished that it had been possible for British tuberculosis experts to have participated.

THE NATIONAL ASSOCIATION FOR THE PREVENTION OF CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

The recently issued report of this body contains much interesting matter. The Association has continued its efforts to render assistance to many discharged consumptive soldiers. The report reproduces the following suggestions formulated by Sir William Osler: "(1) A more searching examination should be made of recruits. Doubtful cases should be referred to the tuberculosis expert of the district. Men unfit to be worked up to the soldier-standard are simply material for the pension boards. (2) Army experts should decide upon the doubtful cases before discharge. Provision should be made for their study. There are plenty of tuberculosis specialists in khaki whose knowledge should be used to put these borderland cases into their proper categories. (3) A National organization should look after the welfare of the tuber-

culous soldier, with subsidiary branches in each county. A roll and a record should be kept, and every case supervised with the greatest care. As the man who suggests a new society in these days deserves to be shot, I would urge that this National Association undertakes the work, in co-operation with the Society for the After-Care of Soldiers. A small central committee of these two bodies, with representatives of the Local Government Board and of the Insurance Commissioners, could organize After-Care Committees in each county, and bring official pressure to bear upon authorities to furnish the proper hospital accommodation." The Council seem to have considered these points, and came to the conclusion that the disabled soldier should be treated for his disease (tuberculosis as far as the Association is concerned) *prior* to his discharge, as too often it has been found impracticable to treat him after discharge. The soldier after long absence is naturally anxious to rejoin his family and is loath to enter on a course which will still further separate him from his home. As a result he is apt to drift, the disease increases, and in the meantime he is a source of danger to his family. The poor man's home is too overcrowded and the arrangements for carrying out even the barest principles of hygiene, disinfection—boiling utensils, washing clothes separately—are too limited for home treatment to be satisfactory, especially when the disease is advanced, and it is the advanced consumptive who is the chief source of danger. There is at present great need for further accommodation for this class. Proper care for the consumptive, whether soldier or civilian, at all stages of his complaint forms one of the strongest weapons in the effort to save the rising generation and increase the population. The Council report that they have not been successful in securing the adoption of their views regarding the retention of the soldier within the service during treatment, though the obstacles in connection with the separation allowance have been overcome. In reply to a request for a scheme of advice for the guidance of the War Pensions, etc., Statutory Committee, the following Memorandum was drawn up: "The Council of the National Association for the Prevention of Tuberculosis have given much consideration to the 'care' of the tuberculous soldier, and have submitted certain recommendations to the Army authorities, namely: (1) That the soldier suffering from tuberculosis (in whatever form) should be treated for the disease during a certain period prior to discharge from the Army, and (2) that the services of officers in the R.A.M.C. who are experts in tuberculosis should be more definitely utilized in relation to the diagnosis and treatment of tuberculous soldiers. In the opinion of the Council it would be more satisfactory if the tuberculous soldier were retained in the Army—and therefore subject to orders—until a certain amount of special treatment had been received. Under the existing regulations soldiers suffering from any form of tuberculous disease have to be forthwith discharged from the Army, and though they are offered treatment in some hospital or sanatorium it is not possible to be certain that they will avail themselves of it, or, if they do, that they will remain in the institution selected sufficiently long to secure all the benefit which they might obtain from prolonged treatment. This being so there are some grounds for thinking that if they could be retained in the Army and treated under military discipline for a specified maximum time this difficulty might largely be overcome. If, on the contrary, it is found

impracticable to retain them in the Army, after they have been declared unfit for military service, it might be of advantage if the payment of such allowances as they might be entitled to, whilst under medical treatment, apart from any permanent pension, could be made dependent on their acceptance, and loyally carrying out the treatment recommended to them. The War Pensions, etc., Statutory Committee have the opportunity of assisting the tuberculous soldier *after* he has had a period of institutional treatment and after his discharge. The condition of the soldier may then vary: (1) He may be fit to resume work. (2) He may have improved but still require institutional treatment to secure fitness for work. (3) He may have become a 'chronic case' with little prospect of further improvement, yet fit for light work. (4) He may be totally incapacitated for work—definitely invalided. (5) He may be in a hopeless condition—unlikely to live beyond weeks or months. The further steps to be taken will vary according to the man's condition. Thus, following the grouping just given: (1) If he is fit to resume work, suitable work should be found—(a) the man may have work waiting for him; (b) the man would like to obtain work in his own district in which case arrangements should be made through the Statutory Committee's local agency in communication with the local Tuberculosis Authority (Insurance Committee or Public Health Department) or the Tuberculosis Care Committee if such exists; (c) the man may have no plans nor special wish as to residence or work, in which case arrangements should be made through one or other of the organizations referred to below. (2) If further institutional treatment is desirable, arrangements should be made through the local Insurance Committee or Public Health Department of the area to which the man belongs. (3) If the man has become a 'chronic case,' he should be sent home and arrangements for his future care should similarly be made by the Statutory Committee's local agency. For such a case light work should be obtained on the spot through the local Tuberculosis Care Committee, or arrangements should be made for his transference to a farm colony, if such were available. (4) If the man be totally incapacitated, his case should similarly be referred to the local Tuberculosis Authority, who, in communication with the Statutory Committee's local agency, should be able to arrange for residence in a home or other suitable institution. (5) If a man's condition be hopeless, arrangements should be made whereby he should be transferred, whenever possible, to a home for such advanced and dying cases. There is much need for a large addition to existing accommodation of this kind. The Council of the National Association would suggest the following points for the consideration of the Statutory Committee: I.—Military and other hospitals and sanatoria dealing with tuberculous soldiers should be requested to inform the Statutory Committee—prior to the discharge of the man from the several institutions—whether anything further is desirable in regard to his treatment or care, so that the Committee may be in a position to take suitable action in the individual case. II.—The Statutory Committee, through its local agencies, should get into close touch with local Tuberculosis Authorities and Care Committees. Special attention should be called to the lack of provision for the treatment of surgical tuberculosis (*e.g.*, joints, bones, peritoneum, glands, etc.), since many of the existing Tuberculosis Authorities make no special arrangements for dealing with them. III.—The

Board of Trade (Labour Exchange) should be approached in order that the Schedule, now being drawn up, regarding trades suitable for discharged soldiers, should include tuberculosis, with appropriate trades for tuberculous soldiers. It might be proposed that preference should be given to tuberculous soldiers in respect of certain occupations.

IV.—The Agricultural Organization, the Farmers' Union, the Rural League, and Royal Horticultural Societies should be approached with a view to their giving preference to applications on behalf of tuberculous soldiers.

V.—The Statutory Committee should see their way to take part in the establishment of Farm Colonies, where tuberculous soldiers could remain for prolonged periods engaged in farming or other suitable occupations, or alternatively, should contribute to the maintenance of tuberculous soldiers in existing Farm Colonies.

VI.—The Statutory Committee should see their way to establish homes for advanced and dying cases, very few of which exist, and which are most urgently needed, or should contribute to the maintenance of suitable cases in such homes.

VII.—The Statutory Committee should consider the erection of an Emigration Scheme whereby tuberculous soldiers, when sufficiently recovered, might be transferred to one of the Colonies, where the restrictions permit, and where the conditions of life and work might prove more suitable than those at home. In submitting these suggestions, the Council of the National Association desire to emphasize the fact that tuberculosis is a disease of very varying manifestations, and that success in the treatment and care of the tuberculous soldier will chiefly depend on the due adaptation of measures to the particular case." To this reasonable and carefully prepared document the following reply was received from the War Pensions, etc., Statutory Committee: "In reply to the points raised in your grouped suggestions, I am to say that the Statutory Committee have found that it is impracticable to retain tuberculous men in the Army (as your Memorandum suggests in paragraph 2). With regard to paragraph 3, the Statutory Committee have already agreed to carry out this policy as far as it concerns the giving or continuing of Supplementary Pensions, and they have advocated this policy to the Minister of Pensions, as regards the pensions for which the Statutory Committee have no authority. The Statutory Committee have arranged to carry out the suggestions your Council have raised in Points I. and II., but Points IV., V., and VI. cannot be agreed to, as they have no power to enter into any capital outlay for the establishment of farm colonies or homes for the incurables, although they have agreed to maintain cases in institutions established by local authorities. With regard to Point VII., I am to say that Colonial authorities will not accept tuberculous soldiers and sailors as emigrants." It may be noted that the Memorandum was also sent to the War Office, the Admiralty, the Pensions Minister, and the National Health Commissioners. The Council have further embodied their views in the following resolution, which was forwarded to the Ministry of Pensions: "That the National Association for the Prevention of Consumption has again considered the subject of their Memorandum of December, 1916, and urgently presses upon the Statutory Committee the necessity of founding an experimental farm colony or farm colonies for the benefit of ex-service tuberculous men, and is of opinion that this could be best managed by local authorities with State help." The Council clearly do not desire to

confine their advocacy to this one point of the Memorandum. They feel "that there is urgent need at the present moment that a start should be made, considering that over 13,000 men have been discharged from the Army on account of tuberculosis." They also rightly urge that "it is essential to link up the various departments and organizations already in existence and get their support in giving preference to the employment of ex-service men (tuberculous) in the occupations scheduled by the Board of Trade as suitable for disabled soldiers." A list of suitable occupations for tuberculous men is appended to the report. The report contains a record of the work of the Travelling Secretary, Dr. S. Jacob. At the annual meeting, at which the report was presented, on July 16 last, Lieut.-Colonel Professor G. Sims Woodhead, R.A.M.C. (T.), delivered an important address on "Farm Colonies for the Tuberculous."

TUBERCULOSIS IN LONDON.

D. W. H. Hamer, in his last report as County Medical Officer of Health and School Medical Officer, issued from the Public Health Department of the London County Council, provides some interesting data regarding tuberculosis in London.¹ The civilian deaths from phthisis in 1916 numbered 6,491, as compared with 6,875 in 1915 and 6,476 in 1914. The increased deaths in 1915 are attributed mainly to adverse climatic conditions in the winter of that year, and are reflected in the increased deaths from bronchitis, pneumonia, and influenza. In England and Wales the deaths in 1915 numbered 23,630 males, including deaths in the forces, and 18,046 females, as compared with 21,412 and 16,414 in 1914; the increase being slightly greater among males than females. The number of "primary" cases of tuberculosis notified during 1916 (52 weeks) was 17,631, as compared with 18,661 in 1915, and of these 13,547 were pulmonary and 4,084 other forms of tuberculosis, compared with 14,712 and 3,949 in 1915. As in 1915, the work of the Council as regards tuberculosis has been confined within the limits existing at the commencement of the war. The arrangements for dispensary treatment are in the hands of the Metropolitan Borough Councils, and the L.C.C. continue the grant of 25 per cent. of the net expenditure incurred in respect of uninsured persons. Schemes are in operation in twenty-six boroughs (including the City of London), and in another borough a scheme has been conditionally approved, but the work has not yet commenced. Under the approved schemes municipal dispensaries have been provided in eight cases, and in the remaining eighteen cases voluntary dispensaries have been utilized. There are, further, three voluntary dispensaries at work in Stepney. Authority was renewed for the use of 231 children's beds and 100 adult beds in voluntary institutions at the cost of the Council, and for the acceptance of such beds as were available in the institutions of the Metropolitan Asylums Board, the cost of the latter beds being borne by that Board.

¹ "London County Council: Report of the County Medical Officer of Health and School Medical Officer for the Year 1916." Pp. 42. London: P. S. King and Son, Ltd., 2 and 3, Great Smith Street, Victoria Street, Westminster, S.W. 1917. Price 1s.

Limited provision is now available for a few advanced cases. The Council have sought to appoint committees known as Interim Tuberculosis Care Committees, in connection with each tuberculosis dispensary, with the object of bringing together the various local agencies engaged in ameliorating the lot of tuberculous persons in the areas served by the dispensaries, and of insuring that suitable after-care and employment are obtained following institutional treatment; the intention being that these committees should operate until the Metropolitan Borough Councils are in a position to appoint tuberculosis care committees for each borough area, in accordance with the scheme approved by the Council on June 15, 1915. The committees are said to be widely representative of all interests at work, including officials of the Borough Council, representatives of the school medical service and the Council's school Care Committee workers. It is encouraging to find that the Council had been able to establish twenty-eight Interim Committees covering the whole of the administrative county, with the exception of the City of London and Wandsworth. Special endeavours are being made to deal with tuberculous children. At the beginning of 1916 the Council had 240 beds available for young subjects, of which seventy-five were provided by the Metropolitan Asylums Board at Queen Mary's Hospital, Carshalton. The remaining 165 beds were obtained through arrangements made with various voluntary institutions. At the end of the year there were 231 children's beds available in voluntary institutions. Only two open-air schools continue open: one at Shooters Hill, with 64 boys and 40 girls, and another at Birley House, with 57 boys and 41 girls. A school is also maintained by the Paddington Tuberculosis Dispensary at Kensal House. It is much to be hoped that the L.C.C. will before long be able to extend its service to tuberculosis sufferers and particularly to tuberculous and tuberculously disposed children.

NOTES AND RECORDS.

The Reports of Medical Officers of Health and Tuberculosis Officers are for the most part much curtailed in size and meagre in contents. Among copies which have recently reached us we would direct special attention to Dr. E. W. Hope's Report for the City and Port of Liverpool, Dr. Sidney Barwise's Report for the County of Derbyshire, and Dr. Hyslop Thomson's Report for the County of Hertfordshire. Each of these contains matter of interest and value to Tuberculosis Officers.

The Chicago Tuberculosis Institute, by the issue of its *Bulletin* and other publications, is rendering a service of far-reaching importance.¹ The *Bulletin* for June last (Series V., No. 17) contains a Report of the Meetings of the Workers' Welfare Committee of the Chicago Tuberculosis Institute. The Institute has also published a second series of "Lectures on Tuberculosis," delivered before the Theodore B. Sachs Tuberculosis Study Class. A new volume has been issued of the

¹ The Central Headquarters of the Anti-Tuberculosis Movement in Chicago are at 8, South Dearborn Street, from whence full particulars may be obtained regarding the Chicago Tuberculosis Institute and its publications.

"Series of Lectures on Tuberculosis delivered before the Robert Koch Society for the Study of Tuberculosis," from September 28, 1916, to April 26, 1917. The importance and scope of these lectures will be indicated by an enumeration of some of the titles and the names of the lecturers: "Points in Diagnosis and Management," by Dr. R. H. Babcock; "Some Interesting Laboratory Investigations in Tuberculosis," by Dr. H. J. Corper; "Heliotherapy," by Dr. W. H. Watterson; "The Importance of Mixed Infection in Pulmonary Tuberculosis," by Dr. R. T. Pettit; "Tuberculosis in Infancy," by Professor I. A. Abt; "The Diagnosis of Tuberculosis in Children," by Dr. O. W. McMichael; "Open-Air Schools," by Dr. G. A. Gardner; "Preventorium and Home Treatment for the Tuberculous Child," by Dr. J. J. Cole; "The Development of the Sanatorium Movement in Illinois," by Dr. J. W. Pettit; "Phthysiogenesis," by Dr. W. A. Gekler. The lectures deserve careful study.

The last Report of the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis, contains the following valuable contributions: "A Study of the Diet in Dispensary Patients," by Frank A. Craig and H. R. M. Landis; "Pre- and Post-Natal Work," by H. R. M. Landis, Thomas C. Kelly, and Charles C. Norris; "Latent Syphilitic Infection of the Lungs," by H. R. M. Landis and Paul A. Lewis; "Post-mortem Examinations after Artificial Pneumothorax," by Paul A. Lewis and Charles M. Montgomery; "Effect of Ligation of the Pulmonary Vein of the Rabbit," by G. L. Kite; "The Determination of Iodine in the Presence of Organic Matter," by Robert B. Krauss; "The Electrolytic Determination of Iodine Present in Organic Matter," by Robert B. Krauss; "Further Observations on the Presence of Iodine in Tuberculous Tissues and in the Thyroid Gland," by Paul A. Lewis and Robert B. Krauss; "The Distribution of Trypan-Red to the Tissues and Vessels of the Eye as influenced by Congestion and Early Inflammation," by Paul A. Lewis; "Observations bearing on the Possibility of Developing an Experimental Chemo-Therapy of Tuberculosis," by Paul A. Lewis; and "The Influence of Certain Organic Substances on the Growth of the Tubercle Bacillus," by Paul A. Lewis.¹

The last Report of the Boston Association for the Relief and Control of Tuberculosis contains suggestive addresses on "Tuberculosis from the Medical, Social, and Industrial Point of View," by Dr. Edward R. Baldwin, Mr. Homer Folks, and Dr. Lee K. Frankel.²

The last Report of the Anti-Tuberculosis Society of the Province of British Columbia is attractively illustrated, and contains particulars of the work of the King Edward Sanatorium at Tranquille.³

¹ "University of Pennsylvania: Thirteenth Report of the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis," Seventh and Lombard Streets, Philadelphia, U.S.A. 1917.

² "Thirteenth Annual Report of the Boston Association for the Relief and Control of Tuberculosis." Issued from the offices of the Association, 3, Joy Street, Boston, Mass., U.S.A.

³ "Tenth Annual Report of the Directors of the Anti-Tuberculosis Society of the Province of British Columbia." Issued from the Head Office, Suite 34, 553, Granville Street, Vancouver, B.C.

The Bulletin of the National Association for the Study and Prevention of Tuberculosis for July contains an important communication on "A State Tuberculosis War Program," which consists of an outline Program submitted by the Sub-Committee on the Tuberculosis War Problem of the Illinois State Council of Defence.¹

The Bulletin of the Johns Hopkins Hospital for July contains a suggestive article by Allen K. Krause on "Undergraduate Instruction in Tuberculosis."²

¹ *The Bulletin of the National Association for the Study and Prevention of Tuberculosis* is issued monthly from the headquarters of the Association, 105, East Twenty-Second Street, New York City.

² *The Bulletin of the Johns Hopkins Hospital* for July, 1917, vol. xxviii., No. 317. Price 50 cents.

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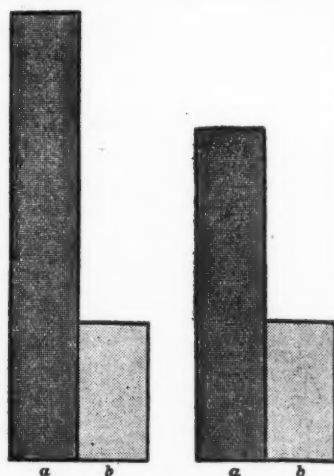
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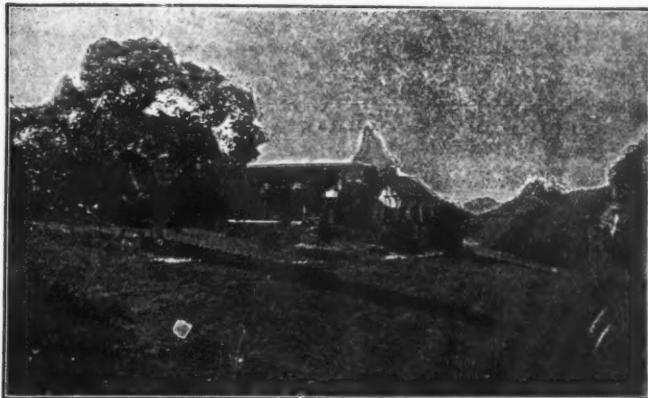
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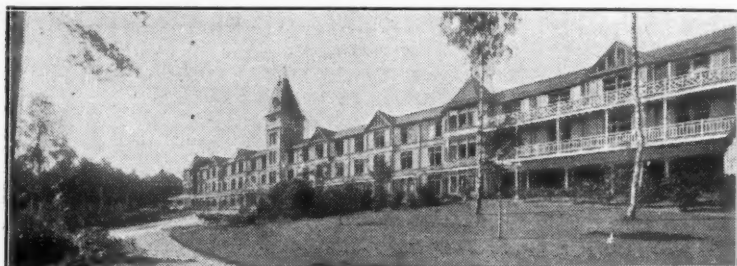
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